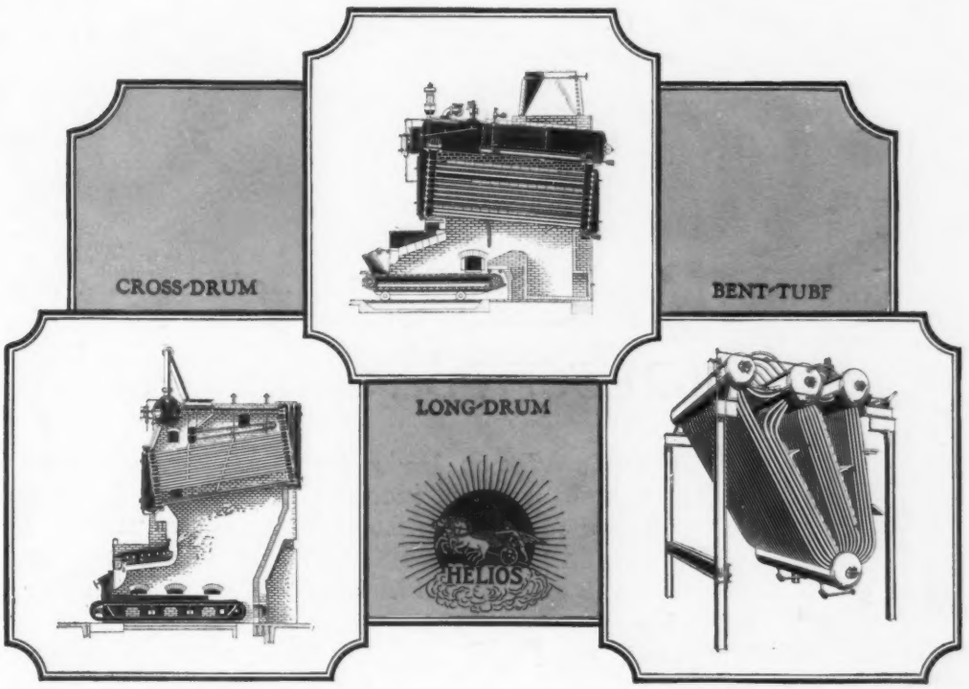
MAY 28 1924

Founded March 1, 1874—Fifty Years of Service — *In Two Sections—Section One*

Electrical World

McGraw-Hill Company, Inc. — *May 24, 1924* — Twenty-five Cents Per Copy



HEINE-built Boilers

Cover the entire range of water-tube boiler practice

Standardized type of Heine Boilers are:

HEINE LONG-DRUM BOILERS

Known as the H-type when equipped with horizontal baffles, and the HC-type when equipped with cross baffles.

HEINE CROSS-DRUM BOILERS

Known as the M-type when equipped with horizontal baffles, and the MC-type when equipped with cross baffles.

HEINE BENT-TUBE BOILERS—*Known as the V-type*

We are prepared to furnish these boilers with all modifications and equipment to meet specifications for any installation.

Individual bulletins describe each type. Copies of any or all of these bulletins will be gladly sent on request.

Heine Boiler Company

5319 Marcus Ave., St. Louis, U. S. A.

Builders of Long-drum Boilers, Cross-drum Boilers, Bent-tube Boilers, Waste-heat Boilers, Marine Boilers, Steel Stacks, etc.

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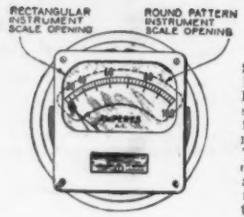
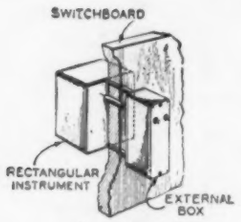
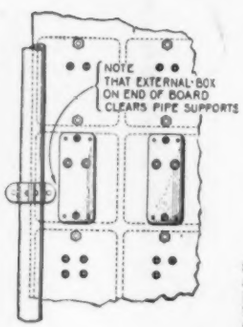


Same Scale Length — The Length of scale is equal for both the round pattern, 7½ in. diameter instrument and these new rectangular types.

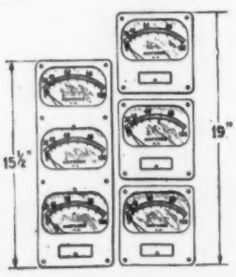


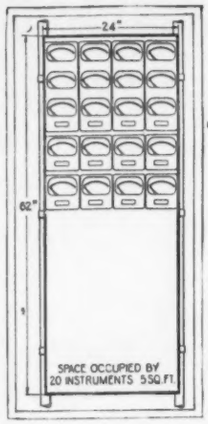
Layout of Rear— External boxes, where required, occupy less space than the instruments.



Studs—All studs are arranged approximately on the approximate center axis of the instruments to clear pipe supports.

Triplex Ammeter. The triplex ammeter allows an even greater saving than the single dial instruments. It saves 3½ inches in height over the three instruments it replaces.





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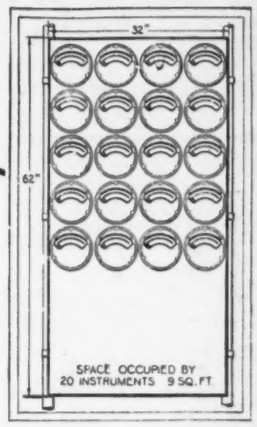


A space reduction of interest to every Switchboard Engineer

Again Weston leads the way. You can now increase capacity without increased space by designing your new board for Weston Rectangular Instruments. With these new instruments, a four-circuit panel requires a board width of only 24 in.

Changes have been external only. No improvement has been, or is necessary in the design of the internal mechanism, which has proved its ability to render a lifetime of reliable service.

With these rectangular instruments, you can put more apparatus on the board, yet conserve every inch of switchboard space not now being utilized to the fullest extent.

The size of the Rectangular Instruments is 5¾ in. in width and 6 in. in height. Instruments project 4¼ in. from the face of the board. Mounting is standardized and greatly simplified both as to the instruments themselves and the external boxes on the rear, when required. Instant and certain readings are assured by wide scale openings. Consider these from the standpoint of investment in space economy.

The new complete group of Weston Instruments consist of Alternating Current, Ammeters, Voltmeters, Wattmeters, Frequency Meters, Power Factor Meters, and Triplex Ammeters; and Direct Current Voltmeters and Ammeters. May we send you all the details and facts on these new instruments. Bulletin 1504 will be sent promptly on request.

Weston Electrical Instrument Co., 13 Weston Ave., Newark, N. J.

Branches in Principal Cities Throughout the World

Electrical Indicating Instrument Authorities Since 1888

WESTON

STANDARD - The World Over

National Electric Light Association
Forty-Seventh Convention

Convention N.

Incidents of the Year's Progress as Shown in Photo

HOUSEWIVES LEARNING TO COOK—And proof enough that the American woman wants to know more about the uses of electricity in the home. A recent cooking school in Boston. From *Electrical World.*

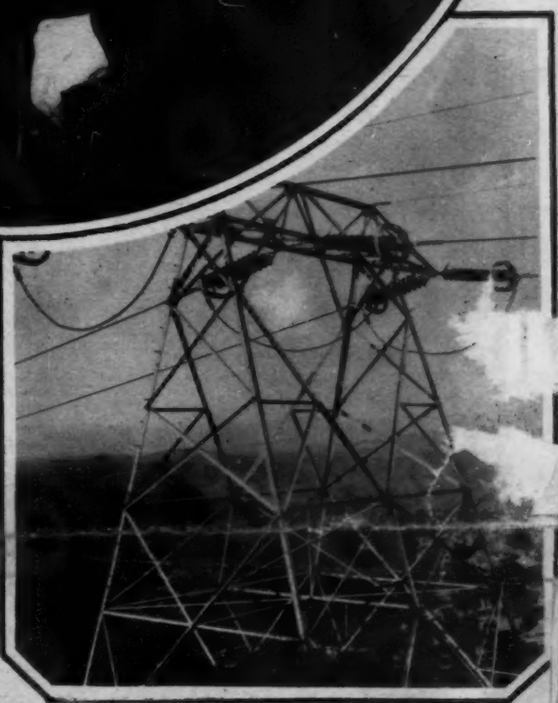
Electrical World
In Two Sections—Section Two
May 24, 1924

N.E.L.A. Pictorial

Photographs—from the McGraw-Hill Electrical Publications

THE SPIRIT OF ELECTRICAL MEN—Thomas A. Edison on his 77th birthday punches the clock as usual, because there is so much still to be done he can't take a day off. From *Electrical Merchandising.*

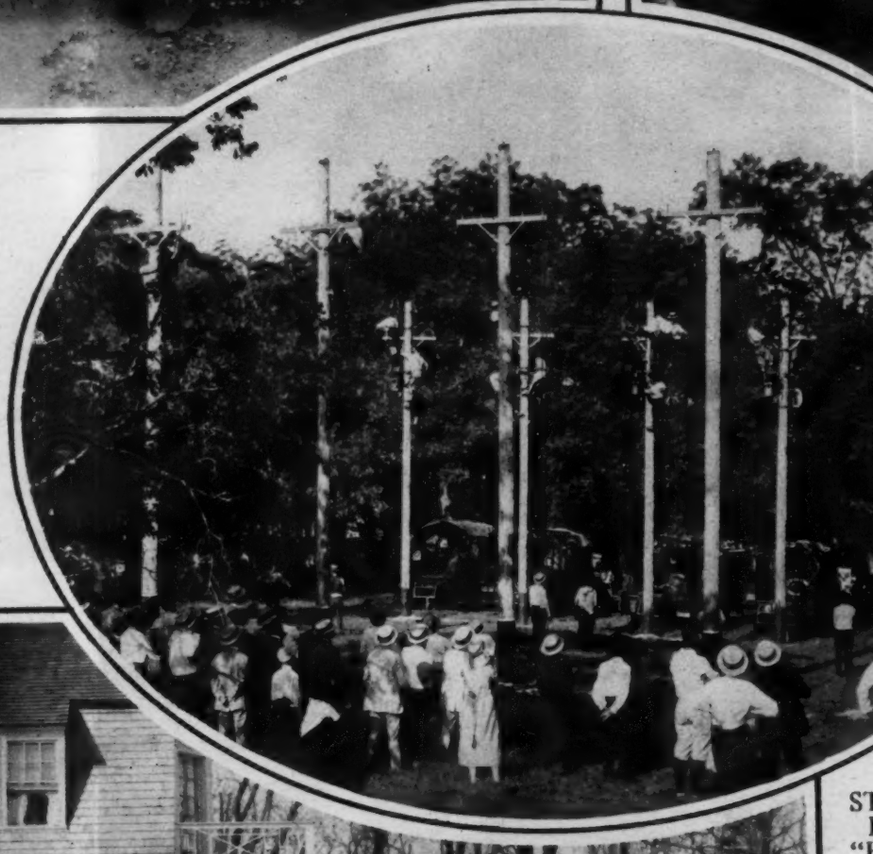
WATER POWER WAITING FOR THE WORD—Snoqualmie Falls, Wash., already partially developed. From *Journal of Electricity.*



THE HIGHEST OF ALL "HIGH LINES"—A 220,000-volt transmission structure on a ridge of the Sierras in California. From *Electrical World.*

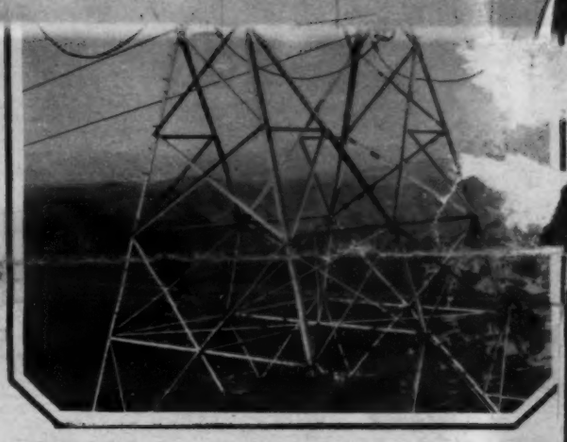
WAITING FOR THE WORD—

THE MOST TALKED OF WATER POWER IN THE WORLD—An airplane photograph of Muscle Shoals—in its present status of development, the prize for which the South and the farmer back Ford against the field. From *Electrical World.*



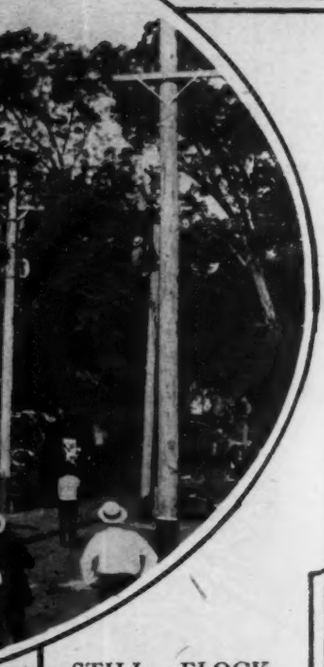
UPS AND DOWNS OF A LINEMAN'S LIFE—A pole climbing contest in Texas, staged at an outing of employees of the Texas Power and Light Company. From *Electrical World.*

WAITING FOR THE WORD—Snoqualmie Falls, Wash., already partially developed. From *Journal of Electricity.*



THE HIGHEST OF ALL "HIGH LINES"—A 220,000-volt transmission structure on a ridge of the Sierras in California. From *Electrical World.*

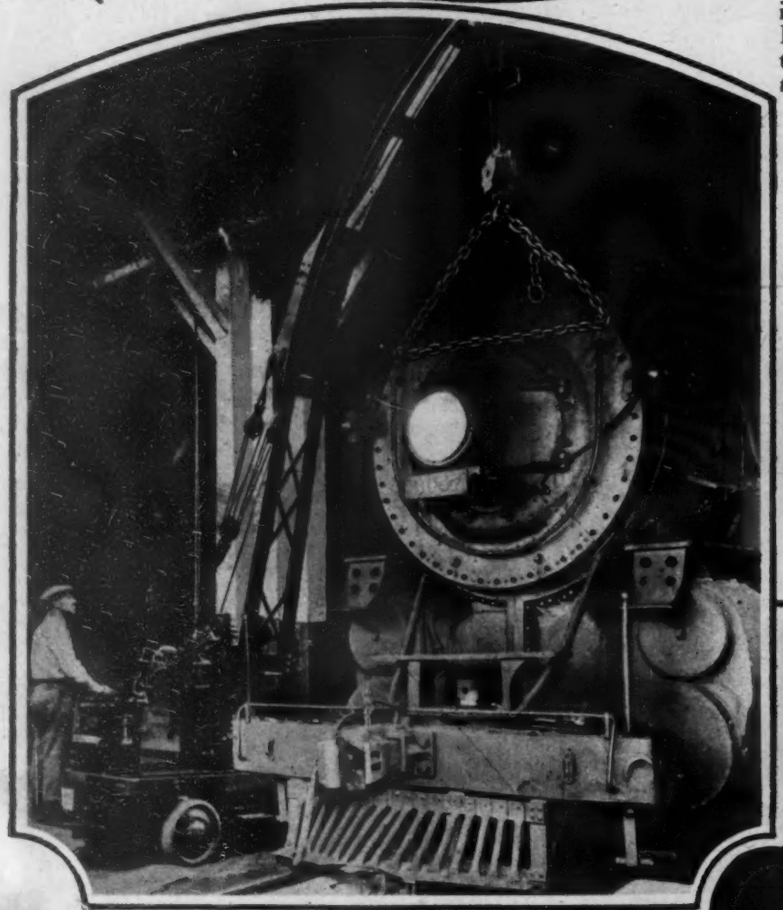
"FIRST IN WAR, FIRST IN PEACE"—Electric power now drives Uncle Sam's strongest battleships. This is the newest ship the U. S. S. Colorado, costing $27,000,000. From *Electrical World.*



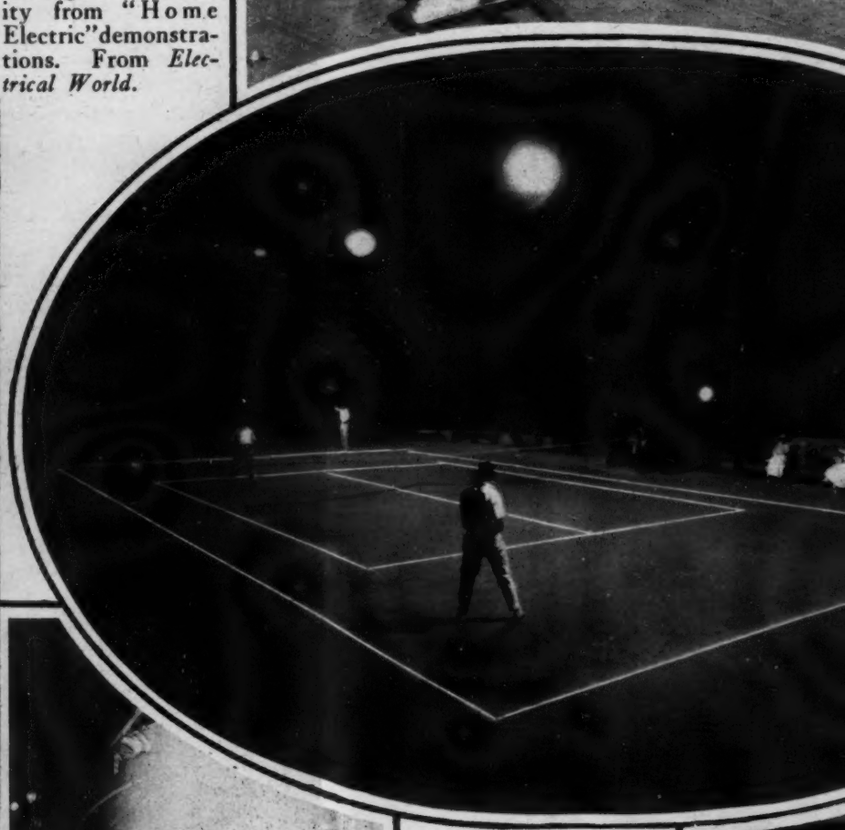
STILL FLOCKING TO THE "HOME ELECTRICS"—This one was in Worcester, Mass., where thousands went to study the uses of electrical appliances in the natural setting of a living home. From *Electrical Merchandising.*

WHERE WILLIAM PENN ONCE MET THE INDIANS—The Philadelphia Electric Company completes its Delaware Station. The first half was built of solid concrete during the war, when steel was not available. From *Electrical World.*

TELLING THE WORLD ABOUT US—"Station W.T.A.T."—The Boston Edison Company's traveling radio broadcasting station that has been sending the message of electricity from "Home Electric" demonstrations. From *Electrical World.*



PUTTING ONE OVER ON STEAM—A small electric industrial crane—a modern David and Goliath—hoisting up the front of a locomotive in one of the big railroad shops. From *Industrial Engineer.*

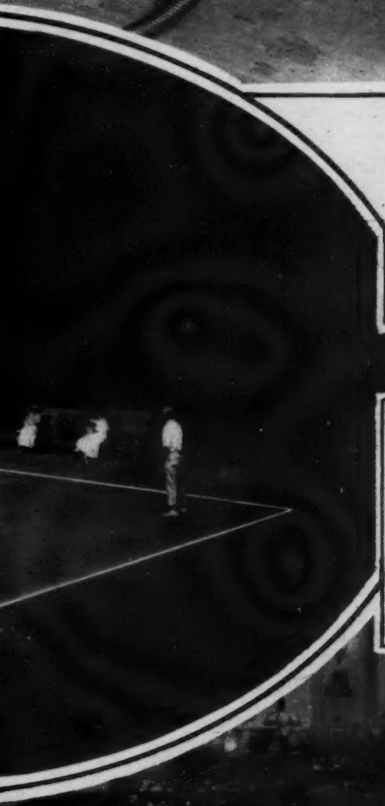


MODERN NIGHT LIFE AT THE COURT—Playing tennis by electric light in Southern California. From *Electrical Merchandising.*

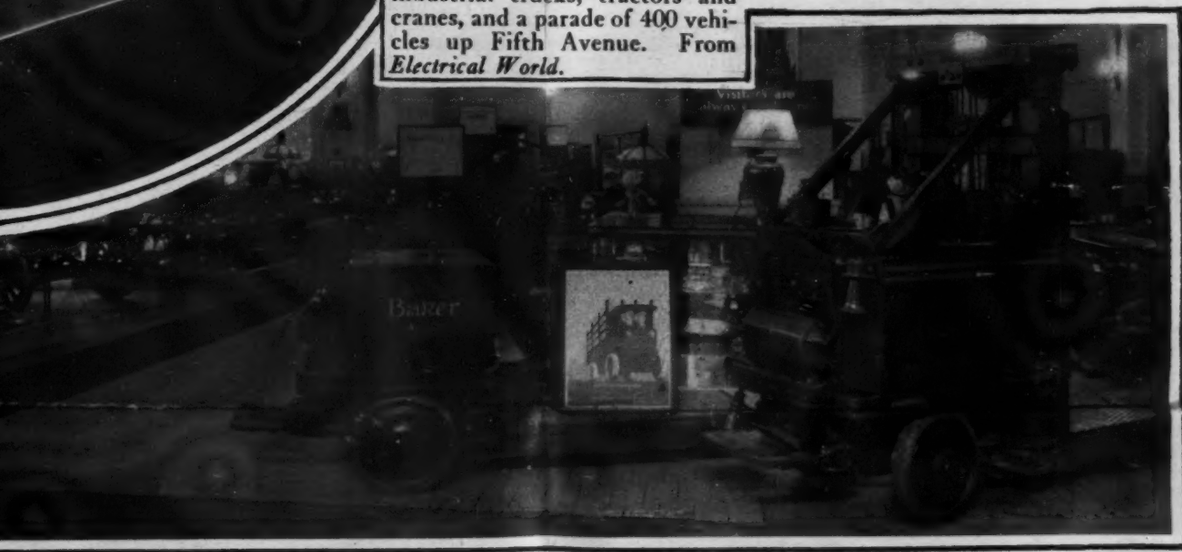
TO LURE THE HUMAN MOTH—New Orleans resumes the Mardi Gras with more illumination than ever before. From *Electrical World.*

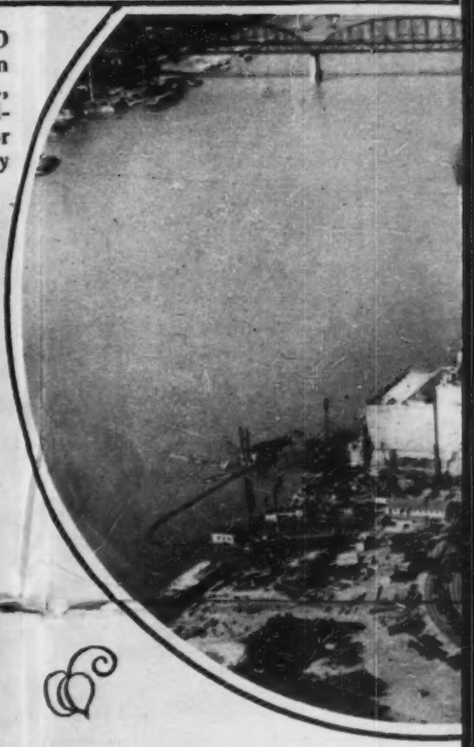
THE CURRY COMB TAKES THE COUNT—Even the stars of the musical stage are now using electricity in their business. Edith Day, leading lady in "Wild Flower," grooms her leading donkey with a vacuum cleaner. From *The Home Electrical.*

LIGHTING A MONUMENT TO POWER—New Building of the San Joaquin Light and Power Corp., Fresno, Calif., a model utility headquarters with a splendid ground floor sales room. From *Journal of Electricity*



ELECTRIC TRUCKS PUT ON A SHOW ALL BY THEMSELVES—New York Edison Company turns the limelight on the electric truck by staging a Truck Show featuring street and industrial trucks, tractors and cranes, and a parade of 400 vehicles up Fifth Avenue. From *Electrical World.*





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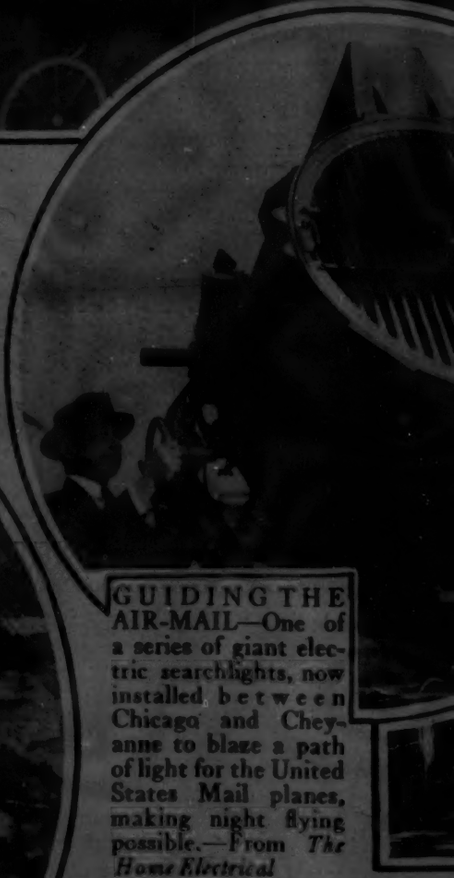
MAKING BILL PAYING A PLEASURE—Central-station customers paying their bills in a Chicago dealer's handy neighborhood store. From *Electrical Merchandising.*



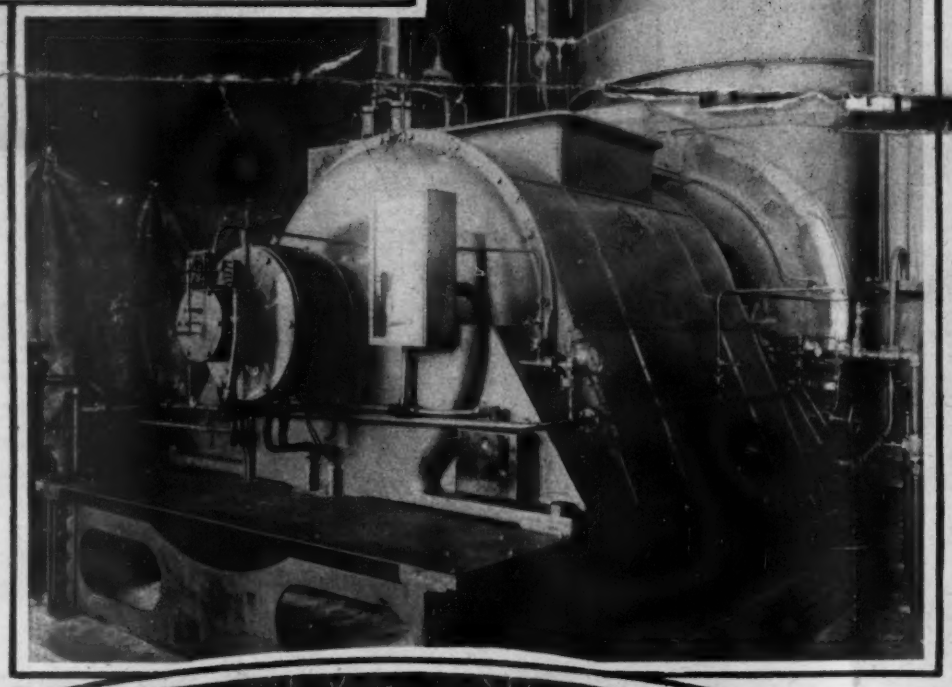
GUIDING THE AIR-MAIL—One of a series of giant electric searchlights, now installed between Chicago and Cheyanne to blaze a path of light for the United States Mail planes, making night flying possible.—From *The Home Electrical*

WHERE COAL DUST REIGNS—The newest and greatest convert to powdered fuel—the Cahokia Station of the Union Electric Light and Power Company, of St. Louis—which will ultimately have a capacity of 300,000 kw. From *Power* and *Electrical World.*

PAYING OFF THE PEOPLE WHO HAVE INVESTED THEIR SAVINGS IN THE ARKANSAS LIGHT AND POWER COMPANY
INVEST IN OUR 7% PREFFERED STOCK AND RECEIVE ONE OF THESE CHECKS EVERY THREE MONTHS
Dividend Checks Have Gone To-

SHOWING WHERE THE PROFITS GO—Customer ownership grows as the public understands the central station better. This window tells the story in Arkansas. From *Electrical World*.

"MINDING THE BABY" NOW A PUBLIC SERVICE—The San Joaquin Power Company installs a Free Day Nursery at the State Fair and cares for several hundred kiddies—something new in public relations. From *Journal of Electricity*.



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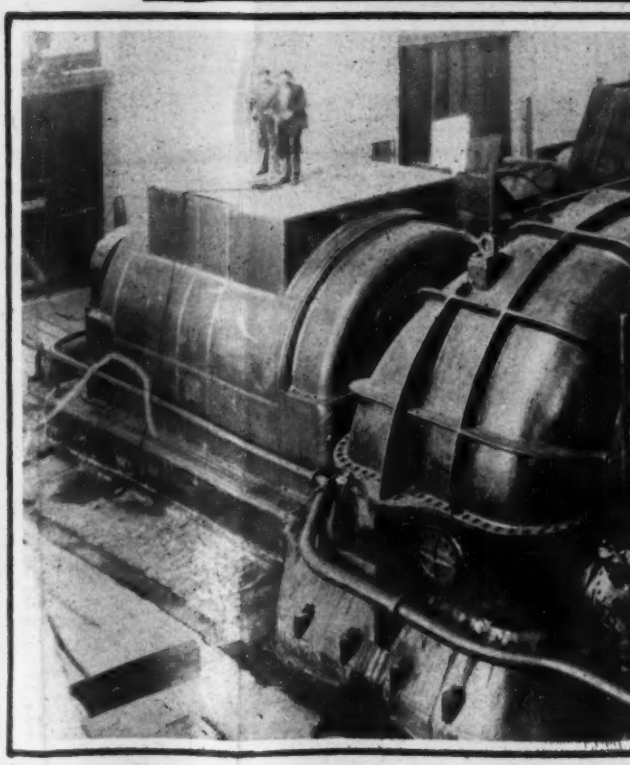
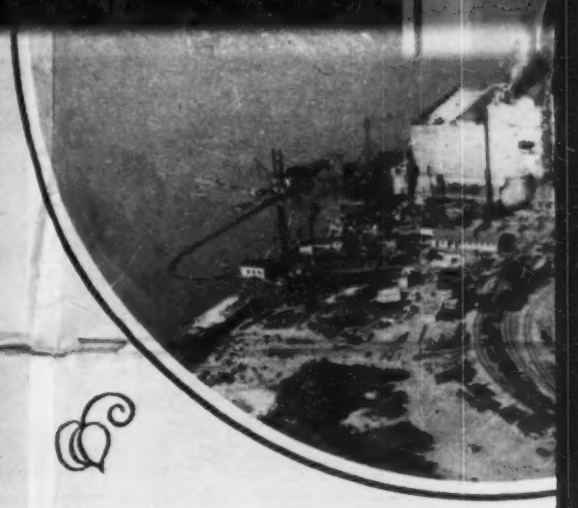
"UNTOUCHED BY HUMAN HANDS"—The New England Power Company's automatic station in Vermont.—*Electrical World.*

ADDING 30,000 RETAIL OUTLETS—The hardware dealer becomes an active advocate of "doing it electrically." From *Electrical Retailing.*

THE BIGGEST THING ELECTRICAL IN NEW YORK—New Hudson Ave. Station, Brooklyn, which will produce 400,000 hp. From *Power* and *Electrical World.*





"What's the News?"—says the E

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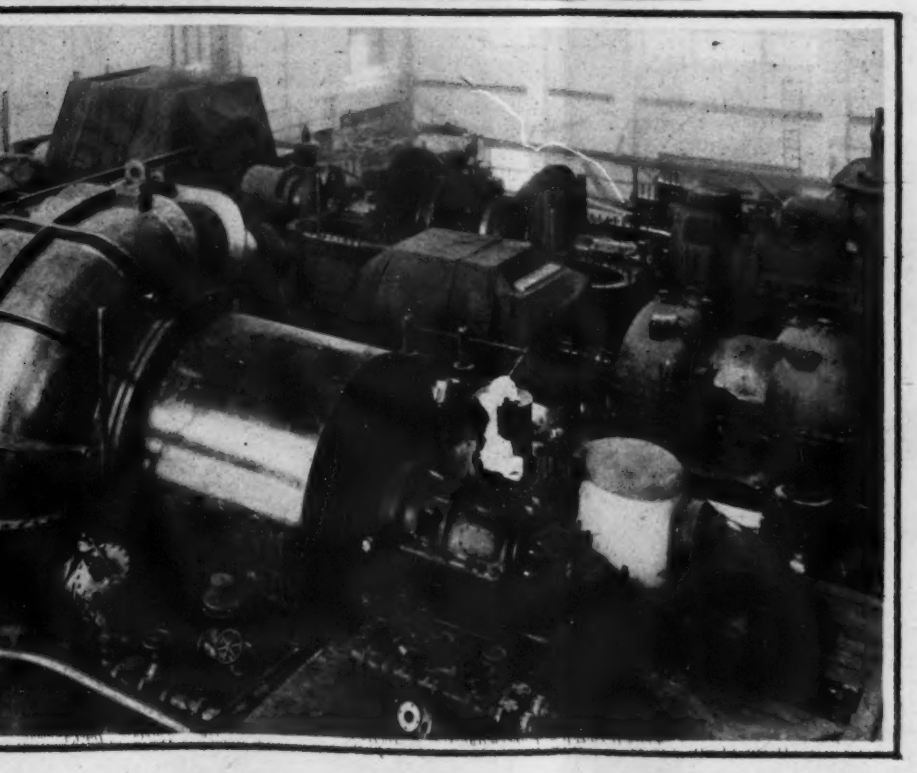

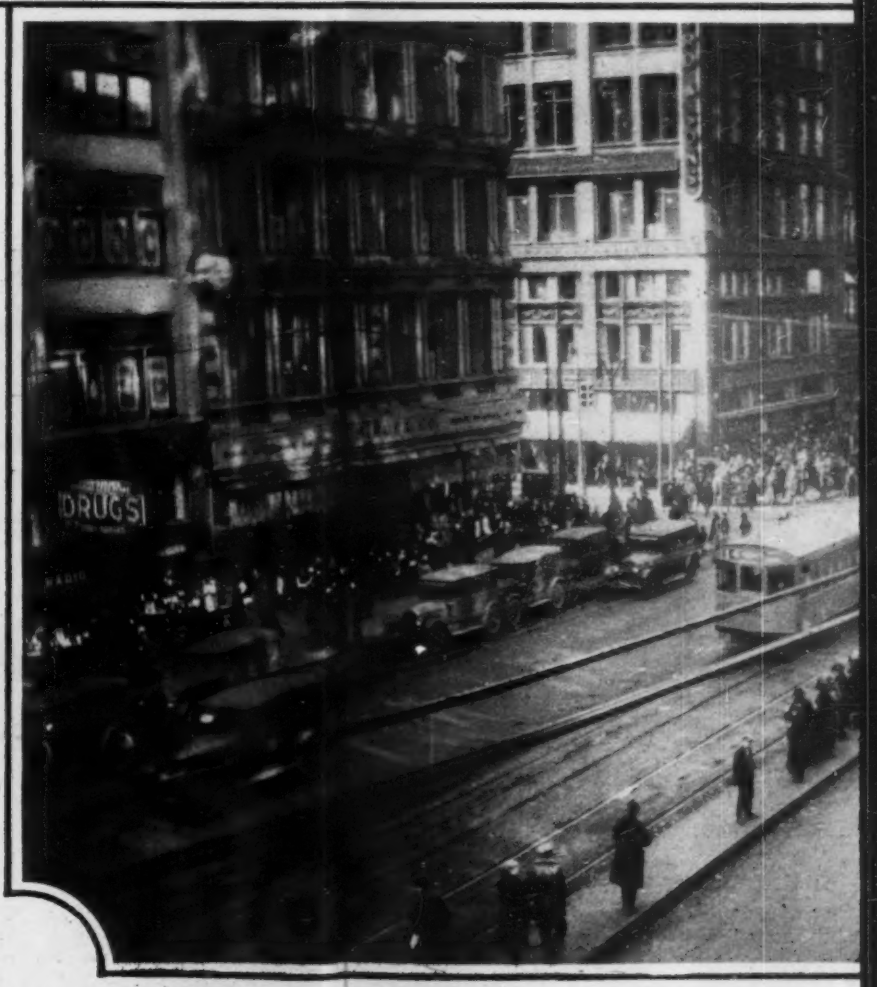

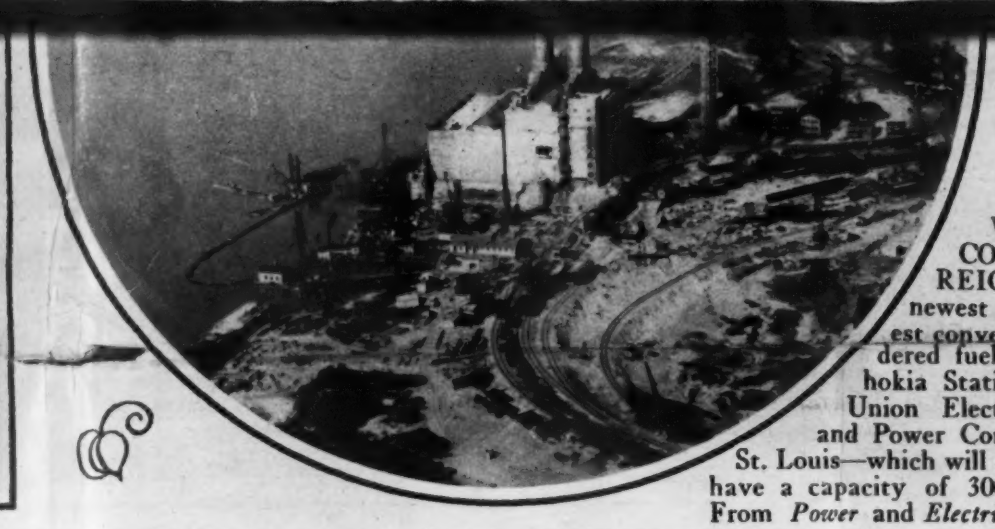

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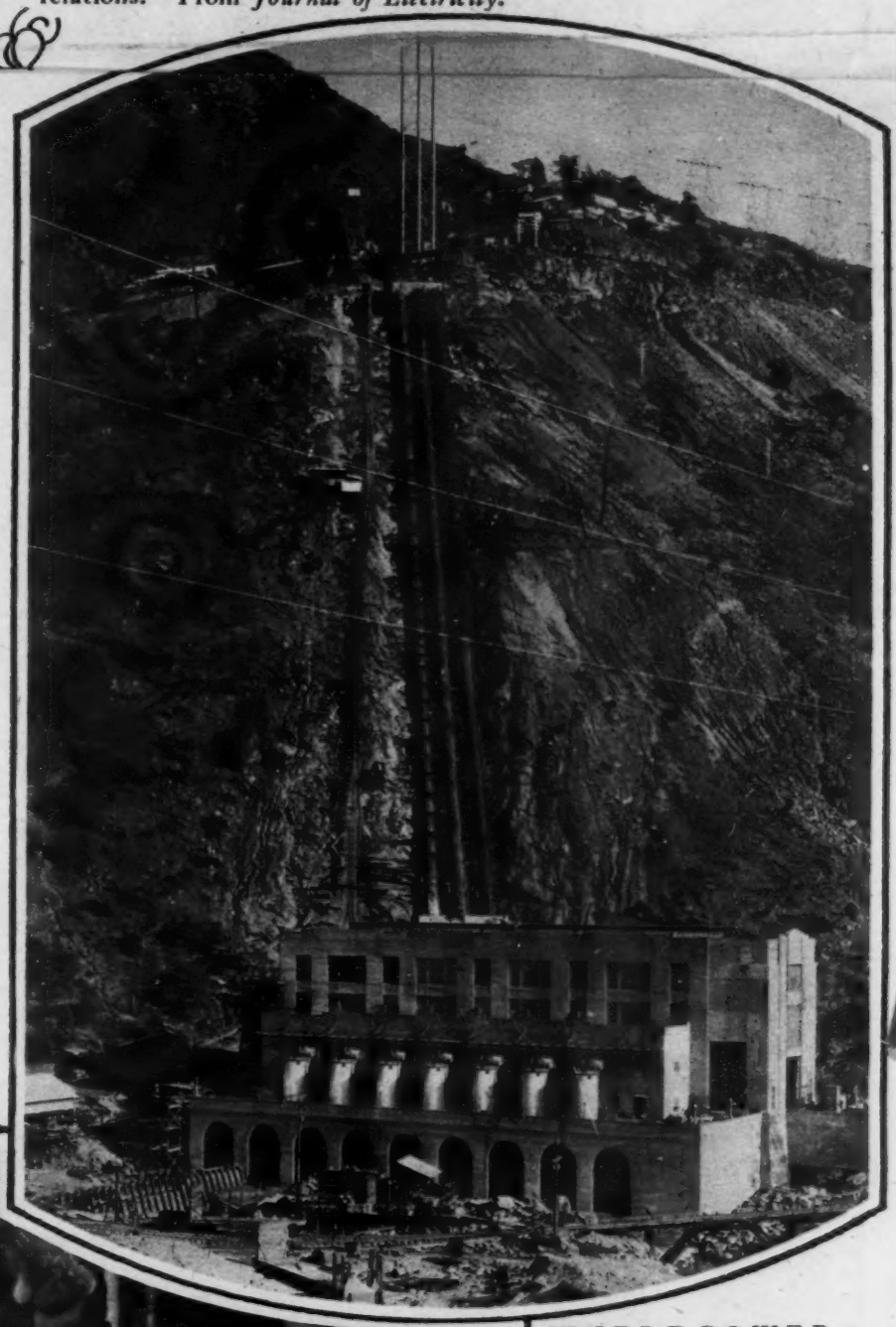
What is this news? It is the reporting and recording of the things that happen, the acts, the achievements and the events affecting electrical men of every kind throughout the world. It is also the interpretation of these acts and these achievements and these events and the opinions that men whose thinking is important, express about them.

The electrical industry looks to the electrical press to procure and provide the news. It relies upon it to present and preserve the written record of the experience and advancing thought of electrical men, the progress of this industry.

ELECTRO MAH JONG CAFÉ A LA PERC—Olga Petrova, the famous Russian author and actress, now starring in this country in "Hurricane," turns from the ways of her mothers, and makes her black coffee in an electric samovar. From *The Home Electrical.*

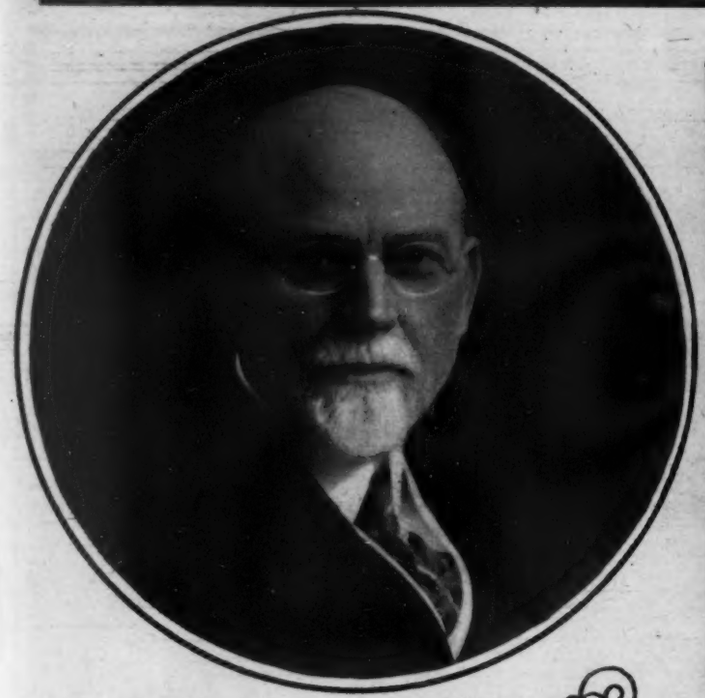
DETROIT TRIES SOMETHING NEW IN TROLLEY CARS—In spite of all the motor cars Detroit is traffic-bound like other cities, and has turned to three-car, four-truck, articulated street railway trains, taking power from a single trolley. From *Electric Railway Journal*

"MINDING THE BABY" NOW A PUBLIC SERVICE—The San Joaquin Power Company installs a Free Day Nursery at the State Fair and cares for several hundred kiddies—something new in public relations. From *Journal of Electricity.*



WHERE POWER ROLLS DOWN HILL—"Big Creek"—The famous hydro-electric development of the Southern California Edison Company, and virtually the heart of the power supply for the southern section of the Pacific Coast. From *Electrical World.*

ELECTRICITY FOOLING THE FOLIAGE—An "electric hot-house" where experiments are being carried out in the artificial stimulation of plant life to develop a practical method of forcing vegetables and flowers for an earlier market. From *Electrical Merchandising.*



JAMES H. McGRAW, president, McGraw-Hill Company, and pioneer publisher of industrial journals, who has guided the principal papers of the electrical industry for twenty-eight years.

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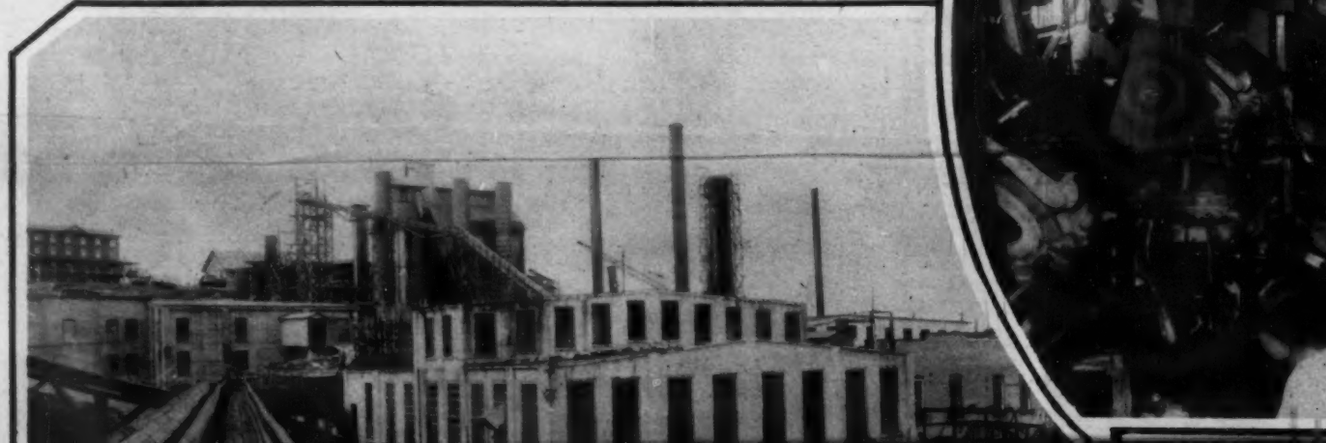
pany.

THE
MEN
BEHIND
THE PRINTED
PAGE—Executive, editorial and business staffs of the McGraw-Hill Company gathered at a banquet in honor of two of their number, who recently completed more than a quarter century of service to the electrical industry.

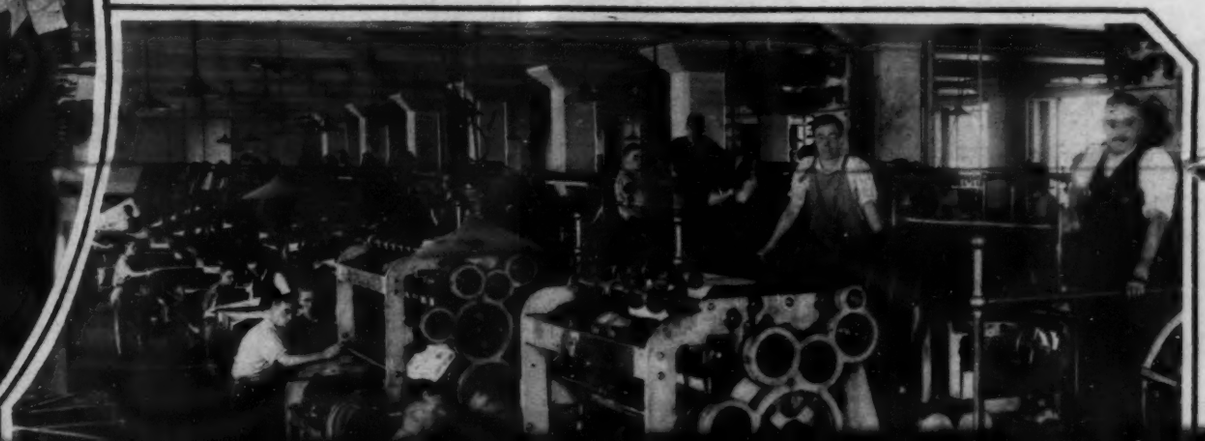


WHERE THE COPY PENCILS ARE WORN OUT—One floor of the editorial and executive offices of the McGraw-Hill Company. Headquarters for fifteen McGraw-Hill publications.

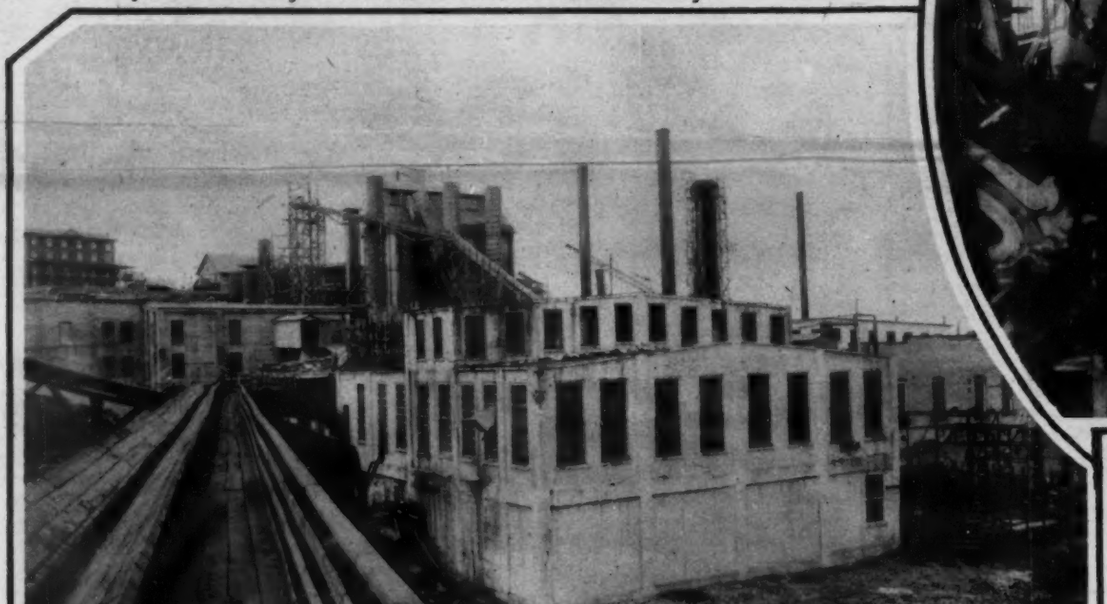
HEADQUARTERS FOR THE ELECTRICAL NEWS OF THE WORLD—Airplane view of the McGraw-Hill building, Tenth Avenue at Thirty-sixth Street, New York City, where four of the seven McGraw-Hill electrical papers are published.

NOT ONLY MAGAZINES BUT BOOKS—The office of the McGraw-Hill Book Company, the largest publishers of electrical, engineering and industrial books in the world.

TEN MILLION MAGAZINES A YEAR—A floor full of giant printing presses that day and night grind out the sheets that make up into the McGraw-Hill papers.



BEHIND THE PRINTED PAGE—Executive, editorial and business staffs of the McGraw-Hill Company gathered at a banquet in honor of two of their number, who recently completed more than a quarter century of service to the electrical industry.



CASTING MET
THOUGHTS—Th
McGraw-Hill linot
aided by the monot
composition room
sets the metal for a
25,000 column inch

WHERE A LOG
ROLL OF PAPE
Graw-Hill paper m
Falls, N.Y., where
for fifteen McGraw
tions that serve sev

McGraw-Hill Service to the Electric

THE character and trend of electrical news has vastly changed in the last fifty years, since the *Electrical World* began to serve electrical men. The cumulative development of the multiplying applications of electricity has been steadily pyramiding not alone the news but the need for news. For no man's school-learning has sufficed him long in the face of the rapid evolution of electrical experience and opportunity.

With this growth has naturally come specialization. And the electrical press has trended with the times, expanding with the industry, until today there is a specialized paper intimately serving every important group of electrical men.

Beginning with the *Electrical World*, the earliest electrical industry publication, the progress of electrical development has been marked by the successive appearance of five other McGraw-Hill electrical journals to lead and serve in some definite field. They are—

Electrical World—Published weekly, the "master" executive and engineering paper, the weekly newspaper of the electrical industry, written alike for the central station man, the electrical engineer, the electrical manufacturer and jobber, and the large contractor, reflecting broadly the activities, problems, opinions, and progress of all groups of the industry.

Electric Railway Journal—A weekly, devoted entirely to the service of those electrical men who are engaged in the street railway industry.

Electrical Merchandising—Issued monthly to the commercial executive, appliance sales manager and salesmen of the central station; the electrical dealer and contractor, and the manufacturer and jobber of appliances, lighting equipment and wiring materials.

Electrical Retailing—A pocket-size monthly pa electrical merchant who sells electrical applianc sideline.

Industrial Engineer—A monthly, talking directly large industrial works of the country, describing operation and maintenance of electrical and asso equipment.

Journal of Electricity—A semi-monthly publi edited for the great electrical community of the P local electrical industry paper.

And with these should be also mentione

Power—Although not an electrical paper, it d week to practical electrical problems of the indu plant, written for men who have come up throug the business.

The Home Electrical—A small pictorial telling th electricity in modern living, for distribution to central stations and dealers.

Every one of these publications has s industry itself in response to a need and the electrical press is an institution o industry, established and supported by for the dissemination of information to Without the knowledge that comes to through the electrical press—through Hill electrical papers—the electrical indu have grown to its present greatness. U trical press continues to serve electrical ance with their changing needs, the indus to realize its great future.

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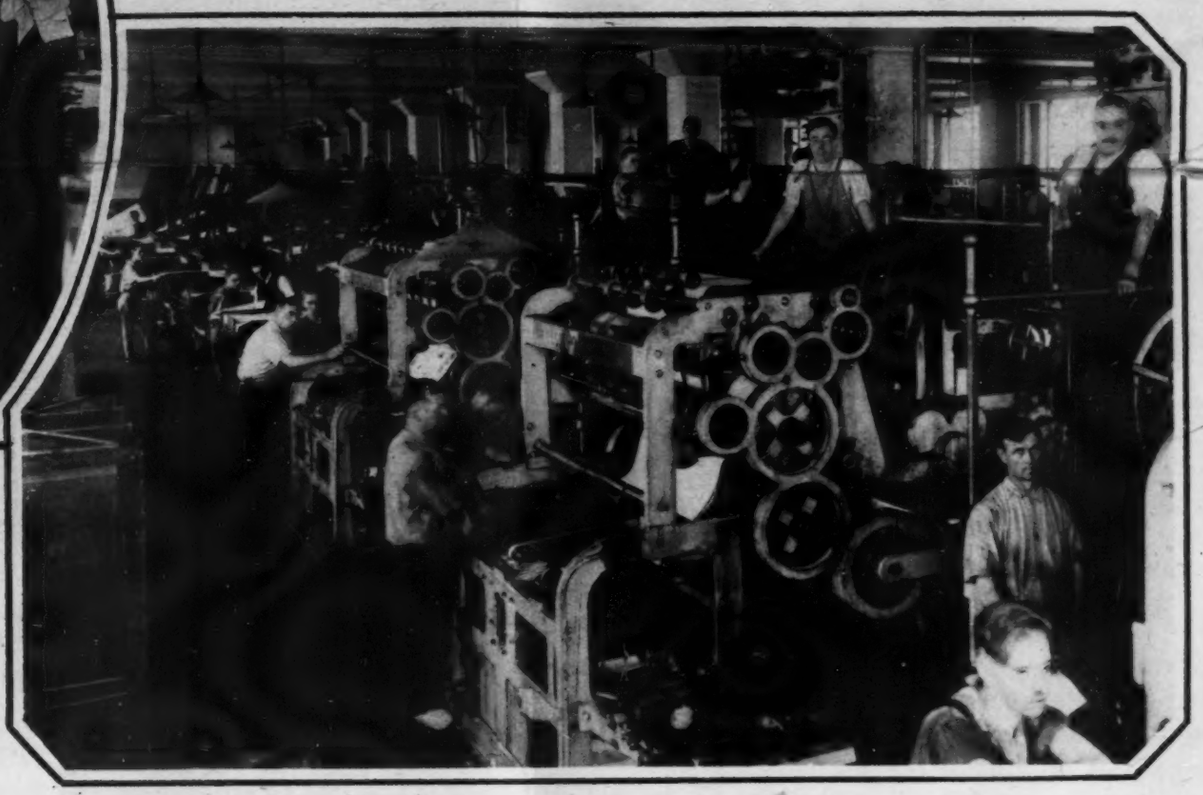

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Electrical World

The consolidation of Electrical World, Electrical Engineer and American Electrician

Published by McGraw-Hill Company, Inc.

W. H. ONKEN, JR. Editor — HAROLD V. BOZELL Editor

Volume 83 — New York, Saturday, May 24, 1924 — *Number* 21

Phenomenal and Spectacular

IT HAS almost become trite in the electrical industry to speak of broken records, so accustomed is every one to seeing records broken and to hearing the term used. Nevertheless, in characterizing this week's convention of the National Electric Light Association—its forty-seventh—it would be neither wholly fair nor the full truth if the assertion that it was a convention which not only surpassed its predecessors but also surpassed expectations and even hopes were not made. In fact, did each convention fail to leave a record of increased impressiveness, of increased strength of the association and of the industry, the convention would belie the industry it represents, which is itself growing by bounds in size and strength and usefulness, and which may therefore well expect, if not demand, that its association's activities at least keep up with, if they do not actually lead, its own advance.

PUBLIC RELATIONS in their many and varied aspects were easily in the foreground as a convention topic, and they were evidently implicit in many discussions not directly labeled with that name. About thirty addresses primarily of a public relations character were presented and discussed by government officials, judges, legislators, educators, financiers, publicists, editors, manufacturers' executives, engineers and commercial men—truly, a wide enough variety to indicate the all-pervading interest and the universal importance that attach to this subject.

The continued proof of the fact that engineering is still the basis upon which the industry is built and an indication of the increased interest of executives in engineering and of the engineers in the executive viewpoint were found in the always crowded meetings of the technical sessions. Engineering interest and flavor were also added by the wonderful exhibit this year on the pier—a feature which always makes a convention more spectacular and more effective.

That the accountant has recognized and enlarged upon his opportunities was strikingly evident at the convention. Not so striking, however, was any evidence of a similar accomplishment by the commercial men as represented by the Commercial Section. Yet, while they have not made the progress that they should, they have seen the greater need for commercial strength and opportunity for commercial activity, and they are both forging ahead themselves and making progress in attracting more executive attention to commercial departments.

THE outstanding feature of the entire convention was the telephoned address of Secretary Hoover. Here is a man who, while not of the industry, has caught its spirit, has visualized its possibilities, its opportunities and its obligations, and has carefully measured its difficulties, as well as, if not indeed better than, many of those in the industry. It will be well to pay heed to what Mr. Hoover said, that it should be both an opportunity and a duty for every electrical man to pass on to the public the things which he said.

From an executive point of view the convention as a whole must be considered a phenomenal success. It was the embodiment of the spirit of a great and growing industry. The hope—and the expectation—is that its future concrete effect upon the industry and upon the men in it will be proportionately as great. It is a challenge to every electrical man to aid in bringing this to pass.

No Room for Pessimism in the Electrical Industry

THE convention just held at Atlantic City, at which one hundred and thirty-five manufacturers exhibited their products, furnished conclusive proof, if any were needed, that conditions in the electrical industry are good and that business is up to expectations. While there has been an economic depression in industrials, most of it, if not all, can be ascribed to the coming presidential campaign and the political situation at Washington. Further, it is noticeable that the electrical industry as a whole has been influenced by this depression far less than other industries, and it is questionable whether the volume of business has decreased at all, for although industrial lines suffered, other lines are very active. Any apparent feeling of depression in the electrical industry can safely be classed as entirely imaginary and psychological.

Gaining Public Confidence Involves No Magic Formula

THE interest shown in various phases of public relations work at the N. E. L. A. convention this week only corroborates the conclusion which any one has reached who has traveled around the United States conversing with utility executives, department heads and employees. That conclusion is that virtually every one is awake to the importance of inspiring public confidence. It takes little power of observation to notice that the best relations exist where the spirit of public service emanates from the chief executive, not as a superficial policy, but as something of the heart. Companies which have been most successful agree that confidence has to be developed by other means than mere publicity, although there is no desire to belittle the part which this can play when good service and the right attitude toward the public prevail.

It is elimination of little annoyances to the customers in the various points of contact which they have with utility companies, the radiation of a sympathetic attitude from every one in the organization and never-failing courteous treatment which count. To establish such conditions requires the practice of these policies at home, since the employee who feels that he is not justly treated can hardly be expected to be thoughtful of others, even if it is impressed upon him that the public is his real employer.

Establishment of a better understanding of utility companies and their problems is the other important factor, but it becomes of less significance as the public is made to realize that its feelings are always being considered. Any company which is sincerely interested in achieving this result will readily see various ways of accomplishing it. The chief thing to remember, almost any successful executive will say, is to tell the public what a part owner of a company would like to know about it. Women's committees and public utility information bureaus are accomplishing excellent missionary work, but their achievements will be great only as they receive the active voluntary support of executives and department heads.

Any company which does not enjoy the public relations it would like to have and has not known how to improve them need only visit a company which enjoys good relations to find the solution. No magic formula should be expected. The activities of every department will have to be studied, even the engineering and operating departments, where public relations might be considered to play no part. Meanwhile nothing better can be recommended than to read the various papers presented before the general, public policy and public relations sessions of the N. E. L. A. convention, some of which were written by men outside the utility industry but invited by it to give it the benefit of their points of view.

Thomas Commerford Martin— Worker and Writer

THE electrical industry lost a great and indefatigable worker a week ago, when Thomas Commerford Martin died. For more than a quarter of a century he devoted to it the best that was in him. He was a gifted editor, a lecturer of ability, a writer of note and a historian who knew intimately every development in the electrical art since its inception. Although not an engineer, he showed uncommon skill in handling technical manuscripts and in describing engineering accomplishments. To thousands in the industry he was an encouraging influence, and many men now in positions of responsibility and prominence owe much to Mr. Martin's interest in them in days gone by.

As an editor of the ELECTRICAL WORLD and as a writer Mr. Martin's name will always be linked with the literature of the industry. He was president of the American Institute of Electrical Engineers when electrical engineering was in the making, and those magnificent edifices the Engineering Societies Building and the Engineers' Club in New York City exist largely because of his activity in raising funds for their erection. When the National Electric Light Association sought some one to direct its rapidly expanding work the choice fell unanimously on Mr. Martin as the best fitted for the task. When finally the burden became too great he retired on a substantial pension. He never gave up writing, however, and up to the day of his death he remained true to all the traditions of his early newspaper training. Few men in the industry were as widely known and beloved as Mr. Martin, and fewer still will be as long remembered as he.

What a Large Truck User's Experience Should Suggest to the Industry

FIFTEEN reasons for his company's using 1,800 electric trucks, as enumerated by President Robert E. M. Cowie of the American Railway Express Company, should cause some of the doubting Thomases among central-station men to pause and consider whether they are not overlooking a bet. Certainly, this business represents a load that is profitable to any central-station company, and it should at least have its day in court.

There is, however, another angle to Mr. Cowie's frank statement of a user's experience of which the truck manufacturers would do well to take note. He suggested that only through side-by-side comparison of the gasoline and the electric vehicle in the same service can the superior merits of either be determined. Would it not be well for the electric truck manufacturers to publish actual and accurate information covering all costs of electric transportation? Not just the bald statement that the "electric" is cheaper *per se*, but detailed cost

figures in dollars and cents on single trucks and fleets in every-day operation, year in and year out, with service and traffic conditions definitely specified—that is the kind of information that is due to the users. It should be available—in fact, it is necessary—for the central station which earnestly desires to promote the electric truck.

There is also another factor in the truck situation on which more information is needed by the central-station company desiring to build a truck load. Mr. Cowie mentioned that the charging and servicing problem must be solved, and it would be a most constructive piece of work to present definite facts on methods and costs of servicing electric trucks. It would greatly advance the probability of increased central-station interest in the truck if these definite data were available.

Mr. Cowie has rendered a service by putting his own experience and his recommendations thus strongly in the limelight. But not always can the truck future rest on the shoulders of the American Railway Express Company, broad as they are. The truck must tell its own story, and fortunately the truck industry has today a program of co-operative and individual selling effort such as it has never had before.

Economic Aspects and Breadth of Thought Characterize Technical Work

TWO notable developments characterized the activities of the Technical Section at the National Electric Light Association convention, and both clearly showed that engineers now as in the past attack their problems with avidity and employ their thought and energy directly and concretely to achieve solutions.

Most encouraging were the development and formulation of the need for engineers to broaden their knowledge of industry affairs and strengthen their position by consciously striving to assume the responsibilities of leadership. Leading executives addressed the engineers and told them that places of leadership awaited them and that only their own failure to seize upon opportunities prevented their attainment of the executive goals awaiting. Leaders in the engineers' own ranks also advocated greater participation in all lines of company activity. No longer does the engineer look upon his work as being solely connected with the inanimate technical aspects of a utility structure. He is beginning to broaden out, develop his personality and take an interest in the human structure that has grown around his endeavor.

The other notable development was a program containing material very diversified and yet co-ordinated and presented in a digested form greatly in advance of previous records. This material has the economic aspect as its predominate characteristic. Addresses on engineers as leaders, accident prevention, legal phases of the joint use of highways, inductive co-ordination and economic features of metering and standardization showed the breadth of interest of the engineers, while the technical reports on the trend in technical development as related to the economic and operating success of the industry were well digested and assembled.

The most auspicious element in the situation was the fact that the engineers themselves made the program and announced the policies. The industry is acquiring a tremendous force through this new development, and the engineer with his mental equipment will more than ever add to its power and prestige.

The Accountant "Arrives"

FROM an obscure bookkeeper absorbed in the writing down of juiceless facts to an executive counselor influencing management and contributing to bring about better public relations the modern utility accountant has passed in a few swift years. Progressive diversification and enrichment of interim work and convention programs have been apparent since the war ended, and the accountant who went home from Atlantic City this week without a new pride in his profession must indeed be devoid of imagination and dull of heart. Never before have his responsibilities and opportunities been quoted so high in the exchange of industry opinion.

Across the chasm of non-understanding which formerly separated the accountant from his brethren in other departments has been built a bridge of co-operation opening a new highway of service to the industry. Highly significant of a better era in both internal and public relations was the well-balanced and diversified program, with its timely messages from speakers outside the industry and broad treatment of accounting technique. The new concern of accounting with public utility regulation, the economics of merchandising, training of personnel, relations with customers, security holders and efficient company management, with particular reference to executive aid, engineering and operation, has established this branch of the industry's work on a high plane of usefulness.

The feeling that due recognition of this by executives is slow in coming is still active, but if accountants "carry on" as they are doing now, nothing can hold back their progress. They have come at last to participate in the inner counsels of the industry, and their admission to reserved seats at the conference table on an equal basis with other qualified experts must soon become a commonplace in every progressive utility company.

Fifty per Cent Authority as Well as Responsibility for the Commercial Branches

CHARLES J. RUSSELL'S plain statement that proper recognition in all matters of policy and development should result in a weighted average of at least 50 per cent in importance and authority for the commercial branch of the central-station company is one of the greatest single contributions ever made to commercial thinking in the industry. As he points out, these departments of the central-station companies, when properly organized, become the primary selling force of the entire industry. There has, however, been a woeful lack of executive attention to the quality of the men upon whom rests the responsibility of developing the present and future field for electric service.

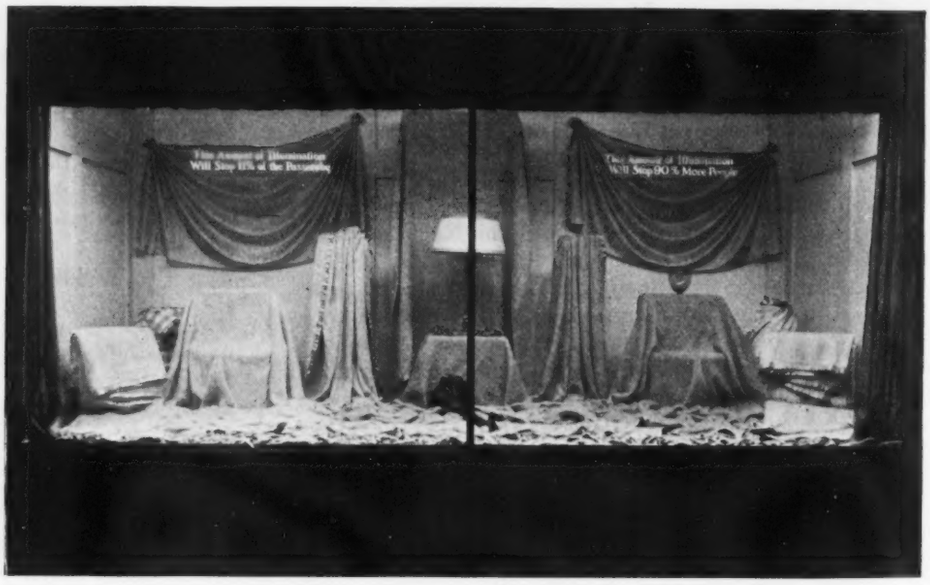
Of that responsibility there has been no shirking, but the power of the commercial man to go ahead and build constructively on his own initiative has ever been hedged about by restrictions too well known to need restating here. If the future development of the entire industry is to result in the adequate saturation of existing markets, the commercial branch must have more power, and the weighted authority of 50 per cent recommended by Mr. Russell does not appear too much. Central-station executives should study, not merely read, the abstract of Mr. Russell's address given elsewhere in this issue.

Living Room Lighting Is Doubly Attractive Where Portable Lamps Are Used

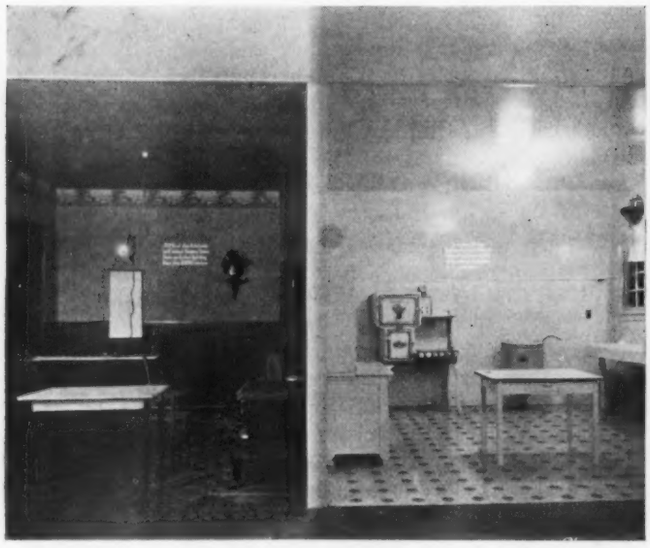
Semi-Indirect Portable Lamps Are Excellent Builders of Load and Good Will

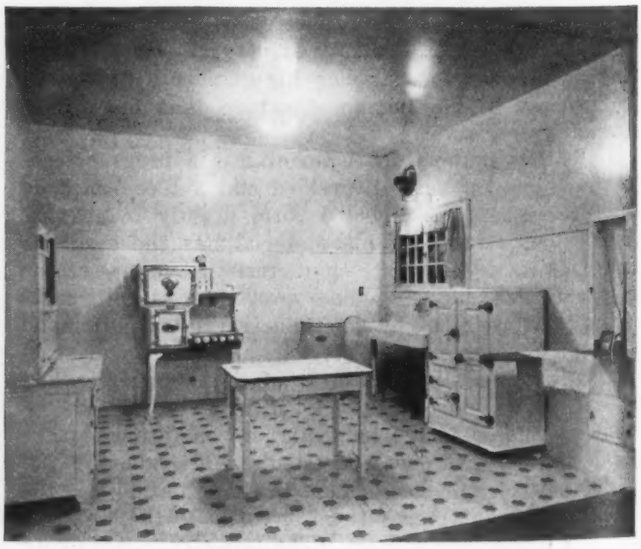
Better Lighting a Nation-Wide Movement

NO CAMPAIGN attempted since the Liberty Loan drives is greater in importance to the public than the better illumination movement under the immediate supervision of the Lighting Educational Committee, in the opinion of Chairman James E. Davidson. All along the line from the shop window to the kitchen the interest of men and women is being challenged by new methods typified in these illustrations. The drive includes a nation-wide school essay contest on home lighting with prizes of extraordinary appeal, including a beautiful modern home. It is hoped to establish better lighting in twelve million American homes, and the work deserves the ardent support of the entire electrical industry.



Skillful Window Lighting Redoubles the Interest of Passers-by

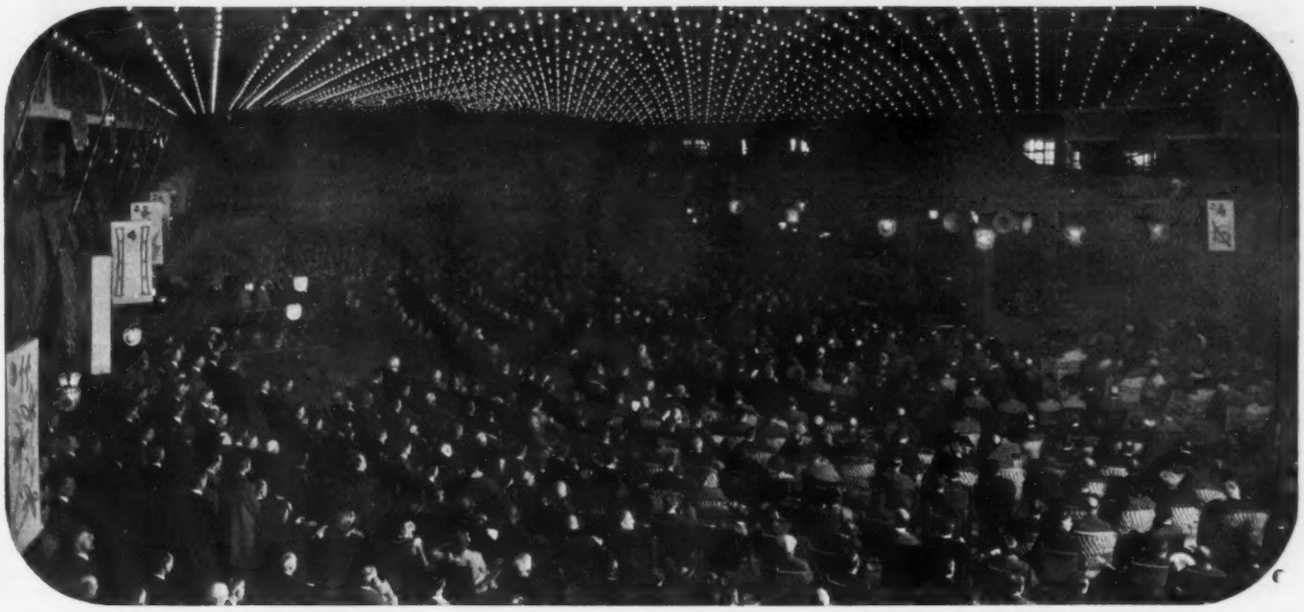




Modern Lighting in the "Workshop of the Home" Spells Comfort and Health

Left—Seventy per cent of the kitchens on central-station lines have no better lighting than this 1890 installation.
Center—A modern kitchen unit adds 60 kw.-hr. a year to the average residential service requirements.

Phenomenal Convention at Atlantic City



THE forty-seventh convention of the National Electric Light Association was held at Atlantic City, N. J., from May 19 to May 23. In character and quality of attendance and general scope and excellence of program the meeting was phenomenal.

The special registration totaled almost six thousand and some 53,000 square feet of exhibit space was filled as compared with the previous record of 38,000 square feet.

Distinguished public officials told the convention in a series of notable addresses their views of the public functions, the duties and the responsibilities of those charged with the conduct of the electric light and power business, and a group of leading newspaper editors bore convincing testimony to the ever-growing necessity for a clearer public understanding, feasible only through the medium of the press, of the aims which motivate every act of the utility executive. The telephonic address of Secretary of Commerce Herbert Hoover, as well as the speech of Senator Arthur Capper of Kansas, both of which were broadcasted by radio throughout the eastern section of the country on Wednesday evening, were among the outstanding features of the convention.

Rarely has there been assembled under one roof anywhere in the country so vast and so constructive a display of electrical apparatus, equipment and appliances as in the exhibit arranged on the Million Dollar Pier by the association, which co-operated with 136 individual exhibitors. Nothing even remotely related to electric power except monster power-house units and power-house equipment was missing from the exhibit.

The sessions were all well attended, and the delegates gained five days' extensive and intensive consideration and discussion of details of the industry and its operation, from the standpoint not only of engineers, electrical experts, managers and executives, but also of accountants, legal departments, publicity counselors and the women in the industry as well.

A delightful entertainment program served to bring the six thousand delegates and guests together on the Million Dollar Pier each evening. Victer Herbert led Paul Whiteman's band while thousands danced in the great pier ballroom. Efrem Zimbalist, a famous violinist, enthralled the guests by his playing, and vaudeville artists helped to brighten up the social hour. The convention more than satisfied every expectation of those in attendance.

Year's Work Reviewed—Future Portrayed

President Johnson and Managing Director Aylesworth Point to Accomplishments of the Industry and the Association and Outline Opportunities and Responsibilities Ahead

The opening session on Tuesday was given over to addresses and reports of purely association affairs. The address by President Walter H. Johnson, printed elsewhere in this issue, was a feature of the session and received the hearty commendation of all the delegates. It was specially recommended by the committee on the president's address that copies of it be sent to all state and geographical public utility information bureaus with the admonition to give it as much publicity as possible.

WALTER H. JOHNSON
Retiring President

FRANKLIN T. GRIFFITH
Incoming President

Accomplishments of the Association

M. H. Aylesworth, managing director of the N. E. L. A., in his address narrated some of the recent accomplishments of the association. He pointed out that it has taken a very prominent part in the development of the national water-power policy; that it has demonstrated its foresight and progressiveness in leading the way to a co-operative program with the

farmers of the country in the development of electricity on the farm; that it has led in the spread of information concerning utility companies through the press and by means of public speaking; that it has pioneered in the development of customer and employee ownership of securities; that it has co-operated with the regulating authorities, large investors, insurance companies, savings banks, investment bankers, national banks, in educational programs and in explaining the association and its ideals so as to obtain a thorough understanding by the public of the utilities and to arouse and sustain the interest of prospective investors in the industry. He touched on the co-operative work being carried on between the various branches of the public utility industry, particularly between the communication companies and electric light and power companies, and on the work of the women in disseminating information and in engaging in good-will campaigns. The adoption of a uniform classification of accounts by the National Association of Railway and Utilities Commissioners, the splendid achievements of the joint fuel committee under the direction of John W. Lieb during the last railroad and coal strikes, the organization and maintenance of state committees on public utility information, co-operation with electrical manufacturers in popular magazine and newspaper good-will advertising, co-operation with educational institutions, the work of the committee on relations with financial institutions, co-operation by the association with the Department of Commerce and with the Department of Labor, the activities of the legal department, and the nation-wide educational movement for better lighting, were also mentioned and explained. Mr. Aylesworth drew attention to the fact that many of the accomplishments of the N. E. L. A. are naturally intangible. He showed, however, that as a result of the work of the insurance committee most of the companies in the association have effected savings in premiums which more than pay their annual dues.

Uniform Classification of Accounts

W. A. Jones, chairman of the Accounting National Section, indicated that there are thirty-eight states and the District of Columbia which now have duly constituted regulatory bodies with full jurisdiction over the accounts of electric public utilities. Of that number twenty-two have adopted the uniform classification of accounts promulgated by the National Association of Railway and Utilities Commissioners and indorsed by the National Electric Light Association. Of the other states, California has adopted the classification of the Federal Power Commission, while Arizona, Louisiana, Maryland, Missouri, Montana, New Hampshire, New Jersey, the District of Columbia, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota and Vermont have not yet acted. The North Carolina commission, however, has issued a form of annual report which is based upon the uniform classification of accounts, and it was urged that member companies bring the matter to the attention of their respective commissions for action.

Co-ordination of Engineering Talent Necessary

"Looking into the future," said H. P. Liversidge in his report as chairman of the Technical National Section, "it is certain that there is ahead of us a tremendous program which during the next few years will require the expenditure of billions of dollars for plant extensions and energy production alone. Compared with the early history of the industry," he continued, "we are facing a yearly rate of expansion which exceeds the earlier growth during an entire quarter of a century.

M. H. AYLESWORTH
Managing Director

"The engineer's part in the successful management of our physical properties and his relation to the future growth of the industry should be clearly recognized by all. The results for which he must assume the full responsibility will depend largely on the breadth of knowledge and experience which he has at his command. It will be evident," continued Mr. Liversidge, "that the need for an intensive co-ordination of the best engineering talent available is greater today than at any other period in the history of our industry. The necessity for greater attention to the conservation of invested capital and reduction in cost of producing energy must likewise come with increased volume of business, and, in my opinion, there is no more certain method of accomplishing this end than through the medium of established organizations in this association."

Work on Public Relations

Although the youngest of the national sections, that on public relations, judging from the report of H. T. Sands, chairman, has been most active. Courses in public utility management and operation have been established, textbooks on the fundamentals of electric light and power industry, on the case method study of public utility management and operation, manuals on public speaking and manuals for employees are in course of preparation, and twenty-seven bureaus of public utility information are functioning in thirty-six states.

Mr. Sands pointed out that, in the last analysis, public relations should not be determined alone by the character of the service rendered, the price charged for it or the courtesy with which it is dispensed, but by the degree in which the public appreciates that service. The measure of that appreciation, he said, will be determined by the extent to which the public understands the industry. The responsibility of acquainting the public with the problems of the industry is the industry's and not the public's, and the industry should accept it and discharge it.

Commercial Opportunities

Chairman N. T. Wilcox, in reviewing the work of the National Commercial Section,declared that there are greater opportunities for commercial development in the electric light and power field today than ever before. He intimated that for the average central-station company the residence business, if properly developed, could be made to earn at least 50 per cent of the income and suggested that executives seek men of real sales ability to head their commercial departments and pay salaries which will induce high-class salesmen to engage in public utility work. The time has arrived, he said, when the largest gain in net earnings can be obtained by increasing gross earnings, owing to the development and filling in of the central-stration business by the sales department.

Record Crowd Hears Coffin and Pinchot

Pennsylvania Governor Talks on Giant Power and Charles A. Coffin on Industrial Relations—Responsibilities of Central Stations to Customers Stressed by Miss Sheridan

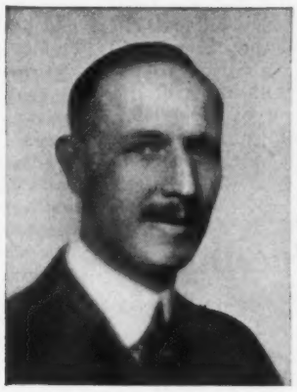
THE Wednesday morning session was one of the best attended the association has ever known at any of its conventions, and those present were well rewarded by the variety and quality of the program.

Educational Committee

The educational committee reported exceptional progress in response from the industry in connection with the educational course this year.

A total of 994 enrollments in the various educational courses were recorded during the year, and since their inception a total of 9,450 courses have been sold within the industry, which means that nearly 10,000 employees have used them to obtain a better knowledge of the business. There are now in operation seven educational courses which have been well received, and other courses are in prospect. The largest company enrollment was from the Public Service Electric Company of New Jersey, with a total of 259 subscriptions. The educational courses have proved to be very popular, and in many ways the committee has been able to enhance interest in the subject.

J. E. DAVIDSON



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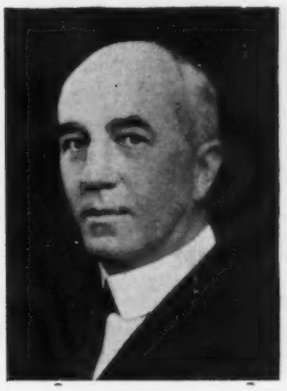
H. T. SANDS



P. S. ARKWRIGHT

Vice-Presidents Elected at Convention

Past-president Frank W. Smith presented in person the F. W. Smith educational prize of $100 in gold to F. Sturz, Jr., of the United Electric Light & Power Company, New York, whose paper in the F. W. Smith contest had been unanimously judged the winner.

Pioneer Days in Baltimore

Accompanying the presentation of the Morrison silver gavel to the National Electric Light Association by the Baltimore Gas and Electric Association, Douglas Burnett, manager of the Consolidated Gas, Electric Light & Power Company of Baltimore, gave a short story of early public utility history and of the activities of J. Frank Morrison, the first president of the association.

Lamp Committee Report

The sales of tungsten-filament lamps in the United States during 1923 aggregated 243,000,000. This the lamp committee, of which Frank W. Smith was chairman, reported to be the greatest number sold in any year in the history of the industry and a gain of 2½ per cent over the previous year. Fewer than 2,000,000 carbon lamps were sold duing 1923, which was a reduction of 33⅓ per cent from the 1922 sales. Of the lamps sold in 1922-23, the average lumens amounted to 692, the average watts to 55.6, and the average lumens per watt to 12.4, which was an 8 per cent increase over the year previous.

In 1923 the demand for the 115-volt group of lamps increased slightly and that for the 220-volt group decreased slightly as compared with the previous year. Nearly 90 per cent of the lamps are in the 115-volt group and less than 4 per cent in the 220-volt group, as shown by Table I. The feature of most outstanding importance is the continued rapid concentration of demands for 115-volt lamps.

TABLE I—DEMAND BY VOLTAGE GROUPS

Voltage Group	1921 Per Cent	1922 Per Cent	1923 Per Cent
115-volt	85.8	88.2	88.8
230-volt	4.3	4.0	3.9
Street series	1.9	1.4	1.6
Street railway	2.6	2.0	2.3
30-volt and 60-volt	4.7	3.5	2.2
Miscellaneous	0.7	0.9	1.2
Total	100.0	100.0	100.0

TABLE II—DEMAND OF LAMPS BY SIZES

Size	1921 Per Cent	1922 Per Cent	1923 Per Cent
Vacuum type:			
Sign	6.1	5.7	4.8
15 watts	3.5	4.5	5.3
25 watts	17.7	18.6	19.9
40 watts	20.2	19.3	17.3
50 watts	14.7	15.5	16.2
60 watts	13.1	12.5	10.9
Street railway	2.6	2.1	2.3
Miscellaneous	1.5	1.3	1.0
Total vacuum type	79.4	79.5	77.7
	1921	1922	1923
Gas-filled type:	Per Cent	Per Cent	Per Cent
50 watts	1.4	1.5	1.7
75 watts	6.6	6.4	6.6
100 watts	6.5	6.4	6.9
150 watts	0.8	1.3	1.5
200 watts	2.2	2.4	2.7
300-1,000 watts	0.9	0.8	0.9
Street series	1.9	1.4	1.6
Miscellaneous	0.3	0.3	0.4
Total gas-filled type	20.6	20.5	22.3

In the demand for the 115-volt group of lamps increased slightly and that for the 220-volt group decreased

F. R. JENKINS
Chairman Educational Committee

The past year was notable for four reductions in the price of lamps, the total change ranging from 40 cents to 30 cents for the 10-watt to 50-watt, 150-volt standard lamp, while the 75-watt lamp changed from 70 cents to 50 cents, and the 100-watt lamp from $1 to 60 cents in the year.

Responsibility to the Customer

Talking under the title of "Belief," Sarah M. Sheridan, vice-president Detrit Edison Company, pointed out the obligation of the company to the consumer, not only from the consumers' standpoint but also from the standpoint of the company, good public relations representing the very highest type of good business in the company's own selfish interest. Miss Sheridan's address is abstracted elsewhere in this issue.

Increasing Respect for Electric Utilities Securities

M. S. Sloan, reporting for the committee on relations with financial institutions, said in part:

"Careful analyses of financial structures and earnings of utilities by bankers showed the financial strength of representative electric utility companies through their regularity of earnings, the stability of the enterprises, the security of their investment issues and their commercial safety in short credits and negligible inventories. These strong factors of financial strength caused a growing approval of investments in these securities until they are now purchased for investment by banks, insurance companies, etc., and are well recommended by most conservative bankers. Public utility securities of the first grade have been approved for savings-bank investments in California, Connecticut, Massachusetts, Maine, Michigan, New Hampshire, Rhode Island, Vermont, are optional in Pennsylvania and are permitted to a limited extent in Oregon.

"During the past year special effort was made to secure legislation in New York, and a strong bill was carefully drawn in co-operation with investment bankers. Contact with insurance companies during the past year indicates that these already large purchasers of light and power securities will in the future become even larger investors in such securities."

The committee also recommended that, whether or not a financial section be organized in the association, the scope of the committee should be broadened so that representatives of bankers' associations and of insurance companies may be added.

Coffin Recommends Employee-Employer Industry Counsel

In a talk specific in its statement and recommendation Charles A. Coffin, who was for so many years at the head of

the General Electric and its associated companies, supported whole-heartedly the principle and practice of direct employee-employer counsel-table methods as the best basis for maintaining satisfactory industrial relations. His address is abstracted elsewhere in this issue.

Claiming that superpower is already out of date, Gifford Pinchot, Governor of Pennsylvania, urged the development of what he terms "giant power," the "integration" as well as the interconnection of power supplies and the most extensive distribution of electrical energy to the farmer and the other small consumers. The only salvation to the future stable development of rural life will be the greater use of electricity.

A further abstract of Governor Pinchot's address is given elsewhere in this issue.

Hoover and Capper Address Meeting

Electric Service Will Relieve Farmer, Capper Says—Hoover Warns Against Politics—Public Policy Committee Reports—Coffin Medal to Public Service Co. of Northern Illinois

THE public policy committee session on Wednesday evening brought a meeting of enthusiasm, of constructive addresses and also of high-class entertainment. The feature of the evening was the address by telephone from Washington, amplified by loud speakers, by Herbert Hoover, Secretary of Commerce. This address is presented almost in its entirety elsewhere in the issue. The other address of the evening was by Senator Arthur Capper of Kansas. Martin J. Insull presented the public policy committee report, and President Walter H. Johnson made the presentation of the Charles A. Coffin medal.

Between these regular program features, the audience, in which there were a large number of ladies, was entertained by violin selections by Efrem Zimbalist.

The Problem of the Farmer

Reduction of farm production costs, the decrease of farm drudgery and the making of the farm home more attractive through the development of uses for electricity on the farm were predicted in an address delivered by United States Senator Capper of Kansas. The extension of electric service to rural communities and the farm, he said, may be expected to result in decentralization of manufacture through the establishment of specialty-manufacturing plants in small communities. These plants would provide work for members of farmers' families and for farm help during seasons when farm activities are at their lowest and during periods of inclement weather, bringing prosperity to these communities and giving the rural population all-year-round work with greater remuneration.

"A brief survey of the larger aspects of the farming industry in its economic phases," said Senator Capper, "reveals the fact that while thirty-four million farmers, living on six and a half million farmsteads, plow and sow and reap that the nation may have the raw products so vitally essential to its welfare and prosperity, some nineteen million other folks traffic in the product of the farmer's toil and get at least two dollars for every dollar that the farmer gets for his products. Without question it is largely due to this fact that more than a million farm folk last year quit the farm to seek a living in town and city. The result of this migration from the farm is deserted country homes and farms abandoned.

"The effect that farm electrification and the extension of electric light and power in practically unlimited quantities to rural communities will have industrially is difficult to prophesy. However, one can scarcely doubt that the effect will be far-reaching. In recent years as electrical energy has been made available there has been a marked and a constantly increasing trend of manufacture away from congested districts and toward the source or sources of the raw materials necessary in the fabrication of finished products. Perhaps the most striking example has been the trend of the textile industry toward the South and now toward the great Southwest, where normally cotton is the predominating crop.

"I am indeed gratified that the electric light and power industry is showing an interest—at once sympathetic and practical—in the problem of the farm, for I am convinced that no greater task confronts this nation and people than the rebuilding and reestablishment of its farm and live-stock industry. A prosperous and contented agriculture is the only safe and sure foundation for a stable government and for an enduring social structure. As we build upon such a foundation we build the most enduring, all-embracing and the only genuine national prosperity."

ARTHUR CAPPER
Senator from Kansas

Report of Public Policy Committee

In its report the public policy committee took up the questions of interconnection, superpower, water-power development, electricity in agriculture, commission regulation, depreciation, standardization, field work, bureaus of public utility information, advertising and educational advance of the women of the industry.

Interconnection or superpower as a general principle is certainly to be desired, the committee held, but it can be economically correct and to the public's best interest only where the demand is such as to support it without loading on the public any unnecessary interest charges which can be taken care of only through higher rates for service. It is therefore necessary, according to the committee, that interconnection, and superpower systems in particular, before they are developed and money for them raised, should receive the careful study of engineering and financial experts, supported by the authority of the commissions where necessary, in order that the mutual interest of the public and the industry be best served.

It was pointed out that coal alone does not determine the proper location of generating stations and that an ample water supply for condensing purposes is equally important. In many cases less investment and more economical generation of electrical energy results from shipping fuel to generating stations built where the water supply is ample than from locating them at the mine mouth, where their growth is limited by inadequate water supply.

"Interconnection," "superpower" and "giant power," according to the committee, are all one and the same thing when carried to their logical conclusion. To a very large extent, the committee claims, this advance has been made already and is developing more and more each day. The extension of service lines beyond municipal boundaries which came with the development of centralized production is now by interconection passing beyond the confines of state lines.

Referring to the agitation in some states for the abolition of public service commissions as a result of appeals to the courts by public utility companies against the rulings of the commissions, the committee said: "While we should certainly not recede from our right of appeal, still, wherever possible, it would seem good public as well as business policy to do everything within our power to settle our differences with the commissions and to appeal to the courts only as an extreme resort."

Opposition to transmission-line crossings over the tracks of some railroads has been investigated by a small committee, and it is expected that joint studies will soon become practicable looking toward a common understanding, probably through joint development of principles and practices governing the procedure for railroad wire crossings somewhat similar to those that have proved so successful in the relations between the electric light and power companies and the telephone industry.

With reference to the bureaus of public utility information now established in so many states, the public policy committee points out that it would seem advisable to bring to the

attention of the bureaus the fact that the economic principles of the electric light and power business are not by any means understood by the public, and that owing to their interdependence, education along this line is of fundamental importance to the public and the utilities. The importance to the industry of advertising and of the further development of public speaking on utility subjects was emphasized.

The committee congratulated the member companies on their work toward a better understanding between themselves, the industry as a whole and the public. In concluding, the report said: "While the popularity of electric light and power securities is fundamentally based on the demonstration of financial stability of the industry during the stressful times of the great war and its freedom from any ill effects during the period of deflation, this popularity could and would not be so great were it not for the ever-growing favorable public opinion toward the electric light and power business. Of the past we may well be proud; to the future we may look for even greater accomplishments."

Coffin Medal Awarded

The Coffin prize awarded for outstanding achievements during the year among the light and power companies went to the Public Service Company of Northern Illinois, which has headquarters at Chicago and serves a larger number of small communities in fifteen counties in northern Illinois. The award was made on Wednesday night at the public policy meeting. Britton I. Budd of the winning company received the medal from President Walter H. Johnson of the National Electric Light Association, who also represented the Charles A. Coffin Foundation, established by the General Electric Company in 1922, the donor of the award. Mr. Budd was also presented with a check for $1,000 for the employees' mutual benefit association of his company.

Some of the things which stood out among the company's accomplishments and which caused it to receive the award over competitors was the fact that in its widely scattered territory, having a population of only half a million, it has promoted company development, public relations and customer ownership with particular success. The gross revenues of the company for the fiscal year ended December 31 amounted in round numbers to $16,000,000, with a net revenue of $2,434,000, an increase in net receipts over 1922 of $599,000. The company serves 197 communities with electricity and has 158,604 customers, and of these 25,000 were obtained during the year. At the end of 1923 the company had shut down and dismantled fifty-five separate small and uneconomic plants in towns in its territory and was serving its communities from four large and efficient generating stations.

During the year the number of customer owners of public securities was increased 35 per cent. They now number 21,409 as against 15,864 the year before. Two rate reductions marked developments during the year, and in addition transmission lines were extended throughout the territory and generating station equipment was installed to feed the growing needs for electrical energy.

In many ways the company is distinguished for its work in public relations. It organized a department of public relations with a vice-president

BRITTON I. BUDD
President Public Service Company of Northern Illinois

in charge, and every effort is made to have staff men to answer complaints by personal call instead of by letter, and it is entering upon the policy of furnishing sixty watt lamps free for replacing burned-out lamps. The company placed on exhibition three electric homes, one of which was visited by 46,000 persons, and established a policy of aggressive advertising which succeeded notably. Newspaper advertising, painted highway bulletins, colored posters, descriptive folders, motion pictures and the publication of a very attractive year book constituted some of the publicity activities of the company which benefited it greatly.

With its employees the same broad policy has been resorted to, the employees saving fund having a total enrollment of 1,769 subscribers, or 85 per cent of those eligible. A safety organization is in operation, and an employees' co-operative council represents them in their relations to the company. The company also has purchased a very attractive vacation resort for the benefit of the employees. Among the employees are found men in prominent positions, one being a mayor, another president of a chamber of commerce, while several chamber of commerce directors, presidents of clubs and of civic organizations are included.

The award to this company was a fitting tribute to its practical realization of the possibilities of development in utilities serving many small and scattered communities.

Water Power and Rural Service Features

Hydro-Electric Development Proceeding as Rapidly as Markets Can Be Found—Definite Progress in Rural Service Studies and Practice

SEVERAL features of note marked the third general session. The all absorbing subjects of such wide popular interest, namely, water power and rural service were discussed. Prof. D. C. Jackson also analyzed the cost of distribution and H. G. Taylor spoke of co-operation.

Mutual understanding and confidence should exist between the employer and the employee, declared the committee on company employees' organization, T. G. Spates chairman, and this can best be obtained through committee activity by having a national committee composed of representatives throughout the country acting under the direction and leadership of national headquarters. During the year a well-attended conference was held at Chicago, at which it was recommended that, inasmuch as the committee on company employees' organization is limited by its name and scope, a new committee, to be called the industrial relations committee, should be formed, of which the present committee should be made a subdivision. The scope and purpose of the new committee would be to work for mutual understanding and confidence between employer and employee and to make available records of experience with plans and methods designed to accomplish that purpose.

Water-Power Development

It is estimated that the streams of the United States can be made to produce 54,000,000 hp., of which 44,000,000 hp. is still undeveloped. It is also estimated that 85 per cent of the undeveloped water power of the country will be subject to the control of the Federal Power Commission and this 85 per cent includes practically all the major projects of the future.

According to Franklin T. Griffith, chairman of the water-power development committee, development of water power is progressing as rapidly as a market can be found for the output, and while this development should be encouraged from an economic standpoint, it is well for those who urge the immediate development of all water-power resources to consider the governing factors. A given prospective water-power development must show, by careful estimate of the factors involved, a satisfactory meeting of the following preliminary conditions:

1. A permanent market must be available for its output.

2. The sum of its operating expenses and fixed charges, under the assumed operating conditions provided by the market, must be not more than the sum of similar expenses and charges of other forms of power supply which are or might be made available.

Many of the possible developments included in the estimated 44,000,000 of undeveloped horsepower will for many years be unable to meet these conditions.

There is no need, said Mr. Griffith, for governmental aid in financing the development of water power or of any other form of power required by the people of these United States. With a negligible exception the electrical

energy required for the use of the people today has been and is being supplied by private investment and operation under public regulation.

With the great demonstration of the workability of the federal water-power act, and considering the millions of dollars actually invested and to be provided by private enterprise in completing projects under that act, and considering also the right that every citizen has to believe that the national government will treat its citizens without discrimination, it is a startling surprise to the men engaged in this industry, Mr. Griffith declared, and particularly to those who have in good faith entered into contracts with the federal government agreeing to comply with each and every provision of the federal water-power act and the regulations thereunder, and who have spent and are spending enormous sums of money in complying with the terms of the contracts entered into, that consideration should be given any proposal to permit the use of any hydro-electric development free from all the terms, conditions, restrictions and limitations imposed by general law upon all the other developers who have in good faith relied upon the uniform application of the law of the nation to all men and enterprises engaged in the business of developing energy from water power. The course which was protested cannot be justified on the theory that the development under consideration—Muscle Shoals—would not otherwise be made and the resultant benefit accrue to the public generally. The plan proposed is unnecessary, is economically unsound, affords no protection to the consuming public and violates the fundamental provision upon which this nation is built—that all its citizens shall have equal rights under the law.

Notwithstanding the many impracticable provisions of the federal water-power act, the electrical industry, according to the committee, is proceeding with development thereunder in full recognition of the right and power of federal and state regulation and control and in full confidence that the provisions of the law will be applied uniformly and without discrimination.

Rural Electric Service

According to the United States Department of Agriculture, the total number of farmers now receiving central-station service is 164,347, or approximately 2½ per cent of all the farmers in the country. This, said the committee on rural electric service, G. C. Neff, chairman, shows that the development of rural electric service from central stations has just started and that intensive consideration is needed to give proper direction to the development.

Many agencies are working in co-operation with the rural electric service committee of the N. E. L. A., and notable work is being done by the United States government in making a national farm power survey and a survey in Europe in regard to farm electrical applications. In conjunction with the Joint Committee on Relation of Electricity to Agriculture, state committees and committees co-operating with universities and other agencies have started investigations on experimental farms and with farm machinery to ascertain costs and other elements of the problem. From these bodies notable contributions to the subject should come in the near future.

One of the most important things in rural electric service is the development of farm equipment suitable for electric drive, and this is a problem that should be met by the manufacturers of electrical equipment, manufacturers of farm machinery, agricultural engineers and electric light and power men.

Cost of Rural Service

Data on costs of operation and maintenance of rural lines were furnished by the Pennsylvania Electric Association, covering twelve rural lines in that state. These data show that the average rate per kilowatt-hour sold was as low as is obtained by most domestic customers in the larger cities of this country. Even so, if the rural customer uses enough energy, the service will

G. C. NEFF
Chairman Rural
Electric Service Committee

be profitable to the central-station company supplying it, but not otherwise. It is striking to note that of the twelve rural lines reported only two earned a return on the investment adequate to pay 8 per cent a year over and above operating expenses and depreciation, and the net result of the business from the twelve lines was a loss exceeding $8,000 in each year on a total investment of approximately $94,000—359 customers having been served for a full year.

No marked changes have been made in state commission rules for supplying rural service. Rules have been adopted in Kansas and some modifications have been made in the existing rules in Illinois and in Indiana.

Electricity in Agriculture

There are unmistakable indications, said E. A. White, chairman of the committee on the relation of electricity to agriculture, that the farmer wants electric light and power service—a most encouraging sign, for it furnishes unmistakable evidence of the desire on the part of the farmer to keep step with progress. There is, he said, also just as conclusive evidence that the electric light and power industry has a deep-rooted conviction that ultimately agriculture will have this service and also that the electrical industry has a most commendable desire to render this service on a basis which is sound in all of its economic and engineering aspects. The problem consists in determining how this service can be furnished at a profit to the seller and utilized at a profit by the purchaser.

The Press and Public Utilities

The press and public utilities are engaged in a common endeavor, serving the public, and are earning therefrom a livelihood, said James T. Williams of the Boston *Transcript* in an address on the press and public utilities. Aside from advertising, however, public utilities have another relation with the press. They are themselves the sources of news of interest to the public—information having a real news value. To make this information available ought to be regarded as a normal function to be exercised with the same intelligence and with the same will to be fair to all concerned, as in the case of advertising, but not by the same agents that place advertising. The two functions are different; their purposes are different; they call for skill of a different sort. To attempt to combine them is to put the press on its guard and to confuse the public. They ought be as separate as is the conduct of the news, editorial and advertising departments of a well-ordered newspaper.

Selling Price and Co-operation

Prof. Dugald C. Jackson Discusses Production Cost Versus Selling Price—H. G. Taylor Points to Advantages of Co-operation in Utility Business

CERTAIN fundamental conditions must always be kept in mind, said Prof. Dugald C. Jackson in his paper on the relation of wholesale manufacturing costs to retail price, when the economics of the supply of electricity is considered. He asserted that the art of electric power generation has been subject to rapid changes in the past, necessitating changes in equipment; that the power requirement imposed on the average central station varies between rather wide limits from hour to hour; that the time at which the service is used and the number of hours it is used during the day or year have an important bearing on the cost of service; that adverse lamp operating conditions are produced by fluctuations in voltage; that the total business done per year is small in proportion to the money invested in the fixed plant necessary to carrying on the business—that is, the "turnover" in the business is very slow, taking several years' gross revenue to equal the capital investment; that, on account of the large investment that is required for gener-

ating, transmitting, transforming, regulating, distributing and measuring electrical energy for retail customers, fixed charges made up of interest, depreciation, taxes, etc., form a large part of the total operating cost, the result being that the total cost of refined energy delivered on the premises of small retail customers is little influenced by the straight generating or production cost of the electric power at the generating station, and that an additional outlay of capital ordinarily must be made for each new customer that is connected to the system.

Large power consumers, Professor Jackson continued, have certain definite characteristics which are quite different from those of small lighting and power consumers. Consumers in this class purchase energy in large blocks and therefore justify the installation of lines of large capacity which can be installed at a low cost per unit of capacity. The large consumers purchase energy at transmission-line voltage, thereby obviating the necessity of the company installing substations and a distribution system. The large consumers use the installation a number of hours a day, and commonly at hours when small retail consumers are making little use of energy, and the two groups therefore join to produce a high load factor, without which circumstance the prices of neither the crude nor the refined electric power could be as low as they now are. If the two types of customers were separated and served from different power companies, experience shows that the loss of economy for the company serving the retail customers alone would be larger than the loss of economy for the other company serving the wholesale customers only, and the retail customers therefore would be injured by such a separation.

Comparison with other commodities cited by the author showed a "spread" from the crude price to the retail delivered price varying from 123 to 130 per cent for unrefined and granulated sugar to as much as 770 per cent for print cloth and a good grade of print. These ratios would in general be larger if comparison were made between a crude article adaptable to many kinds of use and a refined article made therefrom which commanded only a seasonal market.

The latter compares by analogy with the rates charged by the electric companies. Between the large industrial customer buying electric power in the crude, untransformed state and a small retail customer using current for incandescent lighting, including lamps, there is commonly a spread of 500 to 800 per cent, that is, a ratio of from five to eight. Taking the corresponding relations of commodity businesses for a guide, these spreads and ratios do not seem unreasonable.

In one analysis of a fuel using company, the speaker said, the cost of the crude energy at the power house outlets, including fixed charges as well as operating expense, comes out at substantially 65 per cent of the average cost of energy delivered to customers, while for the retail customers this is only about 20 per cent. If crude energy were obtained for nothing, it would therefore affect in small proportion the prices which could be charged to retail customers while maintaining a solvent concern, but it would profoundly affect the price to wholesale customers.

Co-operation in the Utility Business

The speech of H. G. Taylor, president of the National Association of Railway and Utilities Commissioners, contained an abundant measure of fulsome praise for the records established by electric public utilities and for the initiative and foresight shown in the conduct of their business. Commissioner Taylor's address also contained some very wholesome advice and observations. He said in part:

"From the physical standpoint your problem is more or less stable. Constant improvements may be expected. Revolutionary substitutes for existing equipment may be among the possibilities, but the demand for energy is so great that expansion is imperative, and mechanical developments already realized justify capital expenditures on a large scale. The overshadowing problem is one of finance. Financing must be done with a view to what will be demanded twenty-five and even fifty years from today. There is no place in the electrical industry for the man who flippantly remarks: 'I don't care what happens ten years from now.' When an institution becomes so large that it measures its capital outlay in billions, it is large enough to be of concern to every investor in the United States. It must be clean in order to get billions, and it must keep clean in order to prevent disturbance to the whole financial fabric of the nation. Fortunately, the electrical industry faces this unparalleled era of expansion with a reasonably clear record.

"Perhaps the most significant evidence of the wholesome viewpoint of the industry is to be found in its intensive campaign for customer ownership. This movement calls for general approval. To my mind the prime benefit from customer ownership will not come from the opening up of a hitherto untouched mine of capital, nor is the plan likely to be an alibi for ignorant and incompetent operation, nor will it make arrogance in management any more popular than it has been in the past. Customer ownership, if sincerely and honestly fostered, will revolutionize the industry through the introduction of higher moral values in the relations between the utility and its customers. If projected on sound principles, it will have all the mutual advantages that flow from a satisfactory and successful partnership in an essential enterprise. But woe be to the utility that ever violates the obligation which it thus assumes! All of the results from the time and money expended in cultivating satisfactory public relations can be sacrificed overnight through the failure of one or two large electric corporations by unwise and extravagant financing.

"'Superpower' is a word of magic significance that holds for some in the industry and many outside of it a promise of accomplishment almost too great to measure. Let us hope that it does not prove a will-o'-the-wisp, beckoning on to swamps of overbuilding, overcapitalization and overconfidence. As a slogan the phrase has in it all the potentialities of a grand disaster and all the promise of an industrial miracle. Foresight, as coldly calculating as an adding machine, is needed to temper the zeal of those enthusiasts who see today only the rosy glow of an unrealized dream and who, in their fine enthusasm, are tempted to disregard fundamental business principles and to forget that all mechanical and economic problems have not yet been solved.

"Not only is there danger that the public will be deceived by extravagant claims for superpower, but there are signs that some people in the industry itself are taking the golden prospects too seriously. Men of foresight and daring will take chances. That is the American way. But small investors, who are the objectives of the customer-ownership campaigns, should not be asked to assume such hazards.

"Private ownership never before had a more magnificent opportunity, but it likewise never had a greater responsibility. If it can accomplish the task now ahead of it with restrained self-interest and with a continuing recognition of the rights of the public, the achievement will give the final answer to the question as to the relative merits of private as opposed to government ownership."

PORTION OF EXHIBIT SHOWING GENERAL ARRANGEMENT

Long-Established Common Law Controls

Carl D. Jackson Says that Court Decisions Continually Reaffirm Old and Accepted Principles—Insurance Progress of the Year—Warren Viessman Wins Doherty Prize

WITH a paper entitled "The Oil Engine and a Comparison in Economy with Central-Station Service," Warren Viessman, industrial power department, Consolidated Gas, Electric Light & Power Company of Baltimore, won the Doherty medal for this year, awarded at the final session of the convention. No Billings prize was awarded, only one paper having been filed in competition.

Wiring Committee

In co-operation with the Joint Committee for Business Development and others, the wiring committee worked up a recommended specification for house wiring. There are five major items in this specification as follows: (1) There should be at least two circuits for each residence or apartment in each main room. (2) There should be at least one lighting and one convenience outlet. (3) In laundry room, bath, pantry, cellar, hall, entrance porch, etc., there should be at least one lighting outlet, and in each main hallway, laundry room, bath and pantry an additional convenience outlet is strongly recommended. (4) An outlet is defined as the point where the wires come to an end at the ceiling wall or floor, and all outlets are counted as one, whether for single lights, brackets, chandeliers or convenience outlets. (5) Switch outlets are not included in computing the above minimums, but switches should be provided for all ceiling outlets, and three-way switch outlets should be provided for the control of hall and stairway outlets. This specification is made up on a minimum basis and is in the form of a recommendation and a suggestion.

Other work carried out or started by the committee during the year consisted in co-operation with manufacturers in developing standard methods for testing cords, continuation of the work to determine the effect of aging on wires, and some major developments in standardization. In this work the attachment plug and cap and the wall receptacle have been standardized, and the standardization of the appliance plug and the prongs on flatirons, percolators, toasters, etc., is still under discussion, as is also the standardization of a 20-amp. plug and of a 45-amp. three-wire plug or connector. A study is being made of the possibilities of grounding the neutral more thoroughly than is now provided for or permitted by the code.

An interesting development is a study going on in co-operation with the Society for Electrical Development with the object of making a survey as to the saturation point in the house-wiring business and finding a method to determine how to sell more wiring in partly wired houses.

For trying out new developments and new inventions in the wiring field it is recommended that all central stations co-operate under suitable supervision and submit their findings to the proper authorities so that the new method, if safe and satisfactory, may become standard as soon as possible.

Relations with Other National Bodies

John W. Lieb, the official representative of the association to the United States Chamber of Commerce and the National Industrial Conference Board, summarized the purposes and activities of those two organizations. Because of their possible bearing on the activities of the National Electric Light Association, he read the resolutions adopted by the National Chamber of Commerce last year on principles of business conduct, international economic restoration, immigration, soldiers' bonus, trade associations and industrial relations.

Rate Research Committee

A study made by the rate research committee, under the chairmanship of Alex Dow, covered the rate schedules of typical communities of less than 10,000 population and showed that the making of rates for these smaller communities is, if anything, more difficult than for the metropolitan cities, because some one or two classes of service, or even some group of a very few customers, may absorb a large part of the output of the plant. A well-considered rate schedule should foresee the probable changes or diversifications that this condition may bring. During the year there was a renewal of interest in rates for residence service, and it was again asserted that no rate is likely to be challenged which would in reason favor the residence customer. That customer is the general public of economic theory, whose members have no power individually to ease their burdens by passing them to others, and to them therefore the benefit of the doubt should always be given.

Developments in rural rates have been rather slow, but a decision of the Wisconsin Railroad Commission as to farm lighting is important because the commission ruled that the main barns and the poultry house are "on-peak" business and should be counted as active rooms, but that all other lighting of the farm premises should be regarded otherwise. The Michigan commission has also recently approved a rate schedule of the active-room type in which all uses of power on the farm incidental to farming as distinguished from industrial operation would carry the very low secondary rate of the residence schedule.

During the next few years there is a prospect that there will be a great increase of calls for service from major industries which heretofore have been in the habit of producing their mechanical or electical power on their own premises. Care should be taken in figuring rates for these large blocks of service that they will not only bring a new dollar for an old one, but, moreover, will in good industrial years set up a margin of profit which will tide over the years when the industry may be lean and hungry. If the industry asking for a large investment from the utility is to be justified in continuing in existence, it must earn enough surplus in prosperity to carry its total investment over four years. Similarly, if the electric companies are to provide the investment for power supply, they in turn must earn in good years sufficient to carry over the deficit that would normally occur in lean years.

Another element in rate making seriously studied by the committee was the rate applicable to surplus or dump power, especially water power. Good rate-making practice indicates that there shall be recognition in every such instance that the existence of surplus power for sale at dump prices is inherently a temporary condition and that no continuing equity shall be allowed to be built up by the consumer of dump power in the use of that power for purposes of inferior value and at an inconsistent rate. In course of time, indeed, there may grow up in the electrical industry a theory and rule of inferior and superior uses, with corresponding rates.

Important Decisions Rendered

During the year three important decisions were rendered on valuations—namely, the Southwestern Bell Telephone Company case, the Bluefield Waterworks & Improvement Company case and the Georgia Railway & Power Company case. In the opinion of the committee, these decisions boil down into the fact that the reproduction value of a public utility property, or at least what it would cost to replace it with property to give equal service as of the date of the proceedings, must be considered in fixing the value of property as a preliminary to the fixing of just and reasonable rates. That is all that needs to be decided.

The committee urged that, in rate cases particularly, the word "depreciation" should be used with a great deal of hesitation and in its place the phrase "renewal and replacement" should be substituted.

Trend of Court Decisions and Legislation

In presenting an analysis of the trend of court decisions and legislation Carl D. Jackson said that the outstanding fact is that courts and commissions continue in their decisions to repeat and reaffirm the principles of common law established centuries ago and of American law developed in the early days of this Republic. Recent decisions have, in line with these long-established principles, continued to hold that value and not cost is the true basis of determining a rate basis upon which earnings should in justice and in the interest of the continued stability of the utility industry be based. To do otherwise, they have held, would be in contravention of the fifth and fourteenth amendments to the constitution. "Going value" as a

distinct element is still generally supported, being definitely recognized by practically all federal courts and by twenty-two state commissions. Only two commissions have either criticised it or failed to give it consideration in fixed value.

There were several bills introduced in

CARL D. JACKSON
Our N. E. L. A. Legal Authority

state legislatures directed toward the abolishment of commissions or involving a serious impairment of their duties and powers, but they all met with a notable lack of success, it apparently being the continued consensus of enlightened public opinion that commission regulation is the best institution so far devised by governments to govern its contact and relation with public utilities.

In legislation and in commission regulation a matter of considerable interest is the question whether any one class of consumers can be forced to make up losses from inadequate rates to another class. All decisions and practices so far very definitely indicate that it will in the future as in the past be considered against public policy and ordinary business equity to try to permit or order any one to pay exorbitant rates to make up deficits from inordinately low rates to others.

Insurance Committee

The insurance committee, Charles B. Scott chairman, reported that the industry is enjoying a very considerable reduction in fire insurance rates. The continued enjoyment of these rates, or still lower rates, depends very largely upon the insured. Strict and continuous efforts are required to reduce hazards and improve construction and maintenance in order to get material decreases in the schedule rates. A study is now being made of the fire losses of member companies, in order to obtain data to determine whether or not further insurance rate decreases are warranted. The lightning and electrical apparatus clause should be included in all policies, if possible, since it seems very satisfactory. The subject of turbine insurance, electrical breakdown insurance and engine breakdown insurance was considered during the year, and it was decided that the lightning and electrical apparatus clause of the fire insurance policies was most valuable in this connection, and that it was very doubtful that there could be damages from electrical breakdown which would require special protection other than the protection provided by this clause.

The electric truck was rated under a separate insurance classification during the year.

Most of the companies are self-insurers for both workmen's compensation and public liability, and results show this to be good practice and that there is no demand for reduction in rates charged. Accident prevention work carried on by the safety organizations of the utility companies and by others has resulted in a marked decline in the number of accidents and the amount of claims.

The New Officers

Proceeding to the election of officers, the convention unanimously elected those proposed by the nominating committee as follows:

President—Franklin T. Griffith, president Portland Railway, Light & Power Company, Portland, Ore.

First vice-president—James E. Davidson, vice-president and general manager Nebraska Power Company, Omaha.

Second vice-president — Robert F. Pack, vice-president and general manager Northern States Power Company, Minneapolis.

Third vice-president — Howard T. Sands, vice-president Charles H. Tenney & Company, Boston.

Fourth vice-president—P. S. Arkwright, president Georgia Railway & Power Company, Atlanta.

Treasurer—W. A. Jones, Henry L. Doherty & Company, New York.

Seven members at large of the executive committee were elected as follows: Past-president Walter H. Johnson, vice-president Philadelphia Electric Company; H. C. Abell, Electric Bond & Share Company, New York; I. E. Moultrop, Edison Electric Illuminating Company of Boston; W. E. Robertson, Robertson-Cataract Electric Company, Buffalo; James R. Strong, Tucker Electric Company, New York; H. M. Edwards, New York Edison Company, and Gerard Swope, General Electric Company.

Mr. Johnson takes the place of former President Frank W. Smith, Mr. Swope that of E. W. Rice, and Mr. Edwards that of P. S. Arkwright. The other four were re-elected. Five additional members—E. M. Herr, Westinghouse Electric & Manufacturing Company, East Pittsburgh; T. A. Kenney, Hodenpyl, Hardy & Company, New York; W. A. Layman, Wagner Electric Corporation, St. Louis; Harry Reid, Interstate Public Service Company, Indianapolis, and E. W. Lloyd, Commonwealth Edison Company, Chicago—hold over.

Escorted to the chair, President-elect Griffith, in accepting the office with its responsibility, said he knew he could count on the continued support of the entire association so well and generously given his predecessor. He pointed out that many of the men responsible for the present growth of the industry

W. S. MURRAY
Arrives Late to a Meeting on Superpower

are advancing in years and are inclined to wish to shift some of the burdens and responsibilities to younger shoulders, but he thought that many of these men should be drafted back into work so that all of their valued experience should not be lost in the co-operative work of the association.

Section Officers to Be Chosen by President

By a change in constitution the officers of the Accounting, Commercial, Public Relations, Technical and Engineering Sections are to form a part of the president's cabinet and will no longer be elected but appointed by the president from a list of names submitted by the respective national sections. President-elect Franklin T. Griffith will announce his selections before July.

Vice-President Pack Announces Byllesby Accounting Prize

B. W. Lynch, chief auditor for H. M. Byllesby & Company, announced through Vice-president Pack the establishment of a five-hundred-dollar H. M. Byllesby prize for the best accounting paper presented at each annual convention. This is in recognition of the very excellent work which the Accounting Section has done in recent years.

Public Relations Sessions

THE need of establishing a public understanding of utilities will remain a vital issue in spite of what has been accomplished in the past, according to various opinions expressed before the Public Relations Section. For utilities to win the same confidence and esteem which a customer accords his trusted grocer or physician they must establish the sort of confidence which is born of intimate knowledge. If both regulation and initiative are to be retained, it is imperative to harmonize these conflicting ideas. Furthermore, all the advantages which result from individual service and individual reward will be submerged if utilities do not defend their rights by convincing the public that they are based on the principles for which the United States was founded. The reason why some utilities do not enjoy the good will they should is partly the failure of executives and department heads to participate in community life.

Fortunately a clearer conception of what public relations means has permeated the utility industry. Manufacturers have recognized that if utilities do not prosper the remainder of the industry cannot, and they have done some very helpful missionary work. The work of the women's committees has demonstrated that utilities have been making a mistake to hire women just to pound typewriters when they can be used so advantageously in contact with the public. Co-operation with educational institutions in teaching public utility problems is considered one of the most promising activities, since without education the present high engineering efficiency will be largely offset by economic inefficiency. A warning was sounded at the convention that if company executives do not give more active support to public information committees they cannot expect to get the most out of them. The value of such activities is discussed in what follows:

Prominent Editors Tell Utilities the Way to Win Confidence—More than Publicity Is Needed—Utility Courses in Colleges Are Favored—Advantages and Methods of Conducting Customer-Ownership Campaigns

Co-operation with Newspapers

Several Editors of Prominent Journals Contribute from Their Experience Ideas on Co-operative Work and Publicity Methods —Gadsden Advocates Employee Co-operation

AN IMPORTANT development in the Public Relations Section during the year was bringing the customer-ownership committee within its scope, Chairman H. T. Sands reported when the first session opened on Monday afternoon. The work of co-operating with educational institutions has progressed very favorably, he said, and one of the major accomplishments is a new course at Harvard on utility management and operation which will use the case method of instruction. In addition two or three textbooks are in preparation. The manuals for employees have been well received as a result of the work of the committee on employee relations with the public, and four of the twelve numbers have been distributed. The committee on information bureaus made great progress during the year, and there are now twenty-seven bureaus working in thirty-six states. These have well justified their organization and tangible results are becoming more apparent.

Good-will advertising by manufacturers, Mr. Sands said, was stimulated by the committee having this work in charge. The manufacturing companies have been co-operating splendidly, but some of the larger financial institutions have reduced the amount of good-will advertising to some extent, probably on account of the changed condition of the utility security market at this time. The public-speaking activities have been enthusiastically received and a manual on public speaking will soon be available. The relations with financial institutions have been advanced, and positive progress has been made toward getting legislation to permit saving banks to invest funds in utility securities in states where they have not been allowed to do so. A bill making this possible was, for instance, introduced in the New York Legislature. A very great interest has been noticed on the part of insurance companies, which have invested largely in public utility securities.

A new and valuable move has been made by the women's public utility information committee, and this shows prospects of giving large returns in public good will. The work of the customer-ownership committee has likewise been very successful. About $750,000,000 was spent by light and power utilities for new construction during the year, and of this amount $250,000,000, or 33 per cent, was raised by customer-ownership sales. The sale of senior securities to the public does not seem advisable, and in the sale to them of junior securities the partnership element should be accented.

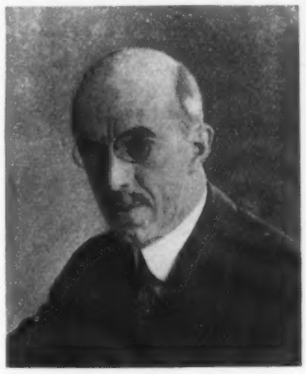
The educational films have proved highly successful and have been exhibited to more than 5,500,000 people, and the work of *Forbes Magazine* and other co-operative agencies has been very encouraging and shows a widespread interest in utility affairs. The real measure of the appreciation of the utilities is found in the degree to which

the public understands the industry and the work it has done. The responsibility to bring about this public understanding falls on the utilities.

Organization of Information Bureaus

There is now a total of twenty-seven bureaus functioning in thirty-five states, according to the committee on the organization of information bureaus, H. C. Abell chairman. During the year five bureaus were instituted, namely, in West Virginia, Oregon, Florida, Connecticut and North and South Carolina. Prospects are bright for bureaus to be formed in the near future in Montana, Minnesota, North and South Dakota.

Best results seem to be obtained when these bureaus are conducted as separate entities. It is not advisable, the committee thought, to have any national direction of the committees, but



P L. THOMSON
Chairman
Manufacturers' Advertising Committee

national co-operation can be secured through co-operation with all the national utility associations.

Work of the Information Bureaus

B. J. Mullaney, director of the Illinois Committee on Public Utility Information, gave an address on the work of the bureau. He said that the need for better public understanding of utility companies remains and will remain vital in spite of what has been accomplished. In fact, because of spectacular achievements in the past the utilities need publicity work more than ever, for the public has come to expect continued extraordinary developments. This publicity and advertising work must be kept on a high plane. Experience shows, Mr. Mullaney said, that the state committees are the best agents to carry on this work in an effective manner.

The Press and Public Utilities

Following the address of Mr. Mullaney, F. Lauriston Bullard, chief editorial writer of the Boston *Herald*, gave an able talk on the press and public utilities. He observed that in many ways the two industries are similar. Each has something to sell, is sensitive to public opinion and provides an essential service. From the newspaper man's point of view as well as that of the public, the utilities are now understood to be living down a bad past, or at least a bad reputation, and it is essential that they do publicity work to convince the public that they are interested in serving it. It speaks well for the utilities that they have heeded this demand for publicity and have convinced the public that a public utility is a national monopoly and one not to be feared.

Publicity is good business practice for the utilities, because a survey of conditions show that if regulation fails, the next step will be public ownership. Privately owned utilities are thus obligated to give close attention to every phase of publicity work.

"Public Opinion"

W. P. Beazell, assisting managing editor of the New York *World*, spoke on "Public Opinion." Newspapers and public utilities, he said, are literally and figuratively in the same business and have a community of opportunity and of duty. They must give service in the higher and finer sense of the word, and this community of interest leads directly to the thought of co-operation between the two industries. Co-operation can be brought about, but it must be remembered that the utilities have more need of the newspapers than the newspapers have of the utilities. The newspapers can help the utilities in both their news and editorial columns, the the utilities must recognize that to get admittance to the news must be true, important and interesting. Material not of news value can be placed in the advertising pages, and the utilities should realize that these pages have an equal influence on an interest for the reading public with the news pages and can be used very effectively in promoting good will.

Co-operative Publicity

P. H. Gadsden, who gave an address on publicity work from the committee chairman's viewpoint, said that the first joint effort by gas, light and power and street-railway companies to get together on this work was during the war in 1917. He asserted that the first state committee, which included all public utilities, was established in Illinois in 1919. Thus the present development of publicity work has taken place within a very short period. All this development has come about because the common problem of utilities is to serve the public. To accomplish publicity work effectively through the agency of state committees it is essential, said Mr. Gadsden, that executive interest be aroused and maintained, and the failure of a few committees can be laid primarily to lack of executive interest. This executive interest should take the form of personal time and thought as well as of financial contributions.

Mr. Gadsden declared that publicity work has only begun. One of the greatest fields of activity yet untouched lies in securing the hearty co-operation of the 750,000 employees engaged in the utility business. Here is an opportunity for real executive work, because it involves the application of the human aspects of the business rather than those which are scientific or capable of being reduced to a formula or method. The state directors can aid greatly in this work. As pathfinders they must work with both the executives and the employees in every way in order to secure employee participation in publicity work.

Discussing the addresses, H. C. Abell declared that executives must "follow through" with publicity work. He cited an instance in which a state bureau originally started by company executives and then allowed to go its own way had failed utterly. Another bureau started at a later date in which executive interest was maintained proved to be extremely successful.

Round-Table Discussion of Committee Directors

On Tuesday morning H. C. Abell presided at a round-table discussion participated in by the directors of the several state information bureaus. Intimate experiences were related by several directors. The most active topic was the value of publicity and the necessity for utilities to do more goodwill advertising. Several points were made about advertising copy, and the experiences indicated that illustrated copy used at frequent intervals is well received. It had been noticed in several states that advertising copy sent broadcast to utilities, even though unused by some of them, still stimulated publicity. An innovation was the insertion of advertisements in the students' papers of universities in order to place the utility story in the hands of students and their parents.

PHILIP H. GADSDEN
Vice-President
United Gas Improvement Company

All utilities should be educated to the fact that advertising is advisable and pays dividends, B. J. Mullaney asserted. He outlined the development that has occurred and stated that the Newspaper Publishers' Association was now in a very co-operative frame of mind toward the information bureau movement. H. C. Abell advised that all information bureaus interchange their advertising copy with one another in order that good ideas might be widely disseminated and used. In his opinion the state committees should have the confidence of the utilities and should be empowered to do their work with full freedom.

Thomas W. Martin gave an interest-

ing address covering the developments of the Alabama Power Company in Alabama, the method used to get good will and publicity on the Muscle Shoals situation and the work yet to be done to bring a satisfactory solution.

Clearer Conception of Public Relations

Analysis of Subject Has Shown New Avenues to Public Confidence—Utilities Must Not Only Know and Discharge Duties but Know and Courageously Defend Rights

THE outstanding accomplishment of the year, declared H. T. Sands, chairman of the Public Relations National Section, in opening the session Tuesday afternoon, is the clearer conception by the electrical industry of what the term public relations really means. It is a new term applied to something for which the industry has always striven, but analysis of the term has disclosed profitable avenues to public confidence. If utilities would win from the public the fullest possible measure of approval and confidence, they must see that the public receives such information regarding the industry as will enable it intelligently to accord that approval and confidence. Good public relations might be defined as that attitude of public mind which

L. B. HERRINGTON
Chairman
Employee Relations Committee

leads the customer of a public utility to accord to that utility the same confidence and esteem which he accords to his trusted grocer or physician. This confidence is born of intimate knowledge. Utilities cannot blame the public for not understanding what it does not know. Utilities must not only state their case—they must prove it. No insurmountable difficulties are imposed. On the contrary, the utility industry is possessed with two assets of tremendous value—a conviction of the integrity of the industry as a public servant and a firm belief in the inherent sense of justice of the American public. All that is needed is a policy of honest, intelligent and persistent publicity. Public relations will be determined by fidelity to that policy.

Employee Relations with the Public

The committee on employee relations with the public, L. B. Herrington chairman, made its principal work of the year the preparation of an employees' manual, which is being issued in twelve installments, five of these having already been placed in the hands of subscribers and employees. Orders have already been received for more than 25,000 of these manuals, and it is apparently serving two very useful purposes. First, it brings the matter of employees' education and relations with the public directly to the attention of company officials, and, second, it provides the employees with a thorough and lucid interpretation of their responsibility and opportunity.

Manufacturers' Advertising Committee

Public relations advertising by electrical manufacturers, P. L. Thompson committee chairman, has continued throughout the year in various forms, with participation by a number of companies. In fact, the electrical industry has been credited in the advertising world with the inauguration of a new school of advertising practice, that in which some of the members of the group advertise in the interest of all. The committee felt, however, that this good-will advertising for central-station companies, financed by electrical manufacturers, had not had sufficient support from the central stations themselves. To increase such support the committee has suggested to the public relations executive committee the appointment of a group of central-station executives to make a survey of the amount and character and standards of public relations advertising now being done by electric light and power companies. It is believed that a greater number of electrical manufacturers would devote space to public relations advertising if more central stations were active in telling their own story locally and giving a local emphasis to the national publicity.

Public Speaking Committee

Public speaking is one of the gears in the transmission system of the Public Relations Section, L. D. Gibbs, chairman of the public speaking committee, observed, in presenting his report, but the more inconspicuous it is the more effective it will be. Any one who is not blessed with the power of eloquence and gesture still has the opportunity to address the public on utility matters by radio broadcast. Since many persons who are called upon to do public speaking often have to fit the preparation of the speech into their spare moments when they cannot do justice to the subject, Mr. Gibbs expressed the belief that the director of public utility information in each section should be the impelling force in providing speakers with material for addresses and in carrying on public speaking. In such speeches the audience was warned to avoid the extremes of speaking which follow the flaming sword of propagandists and the "back-stroking" attitude sometimes indulged in at conventions. Public relations means public acquaintanceship, and this is equivalent to continual broadening of personal acquaintance, continued the speaker. When public relations are developed to this point public speaking will become private speaking with public action and results.

Women's Public Information Committee

Very constructive work has been done this year among the women employees of the light and power industry, as reported by Miss R. E. McKee, chairman of the women's public information committee. The aggregate number of these employees is between 30,000 and 35,000, and a definite influence has been brought to bear upon from 20,000 to 25,000 of them. The committee has developed a program of meetings, embodying lectures and papers on central-station functions and policies, and courses have been organized in a large number of central stations and well

L. D. GIBBS
Chairman
Public Speaking Committee

attended by the women employees. The results of these meetings have revealed to utility executives a high degree of understanding by these women of the problems and aims of the industry and a keen desire to promote the interest of their companies.

The committee presented a number of definite recommendations, urging a more extensive demonstration of electrical appliances, the organization of home economics courses, a larger representation of central stations in women's clubs by women employees, the use of women in customers' survey work and resuscitation, and the preparation of a clearer interpretation of utility rating which may be made available to women employees.

At the conclusion of Miss McKee's report J. F. Owens, general manager of the Oklahoma Gas & Electric Company, commended in glowing terms the work which the women's public utility information committee has done under her supervision. The surprising thing is, said Mr. Owens, that utilities have been asleep at the switch so long in recognizing the value of the services of women in improving public contact.

Rawson Wins Forbes Prize

The prize-winning paper in the national contest recently inaugurated by *Forbes Magazine* was read by the winner, P. C. Rawson, Empire District Electric Company, Joplin, Mo. It pointed out that public relations may be arbitrarily divided into service to the public and education of the public. In touching on service attention was called to the need of keeping ahead of industrial progress by providing adequate service facilities, keeping the plant up to date by periodic inspection and upkeep, the necessity of courtesy and thoughtfulness in the conduct of the application and collection departments, the necessity of prompt attention and sympathy in following up complaints, avoidance of slipshod red-tape organization methods, the importance of utilities advocating only domestic appliances which will give reliable service, the importance of metermen's appearance and conduct, the necessity of executives keeping their doors open to the public and making no promises which cannot be fulfilled, and the adoption of some measure of the quality of service.

National Movement for Better Home Lighting

James E. Davidson, vice-president of the Nebraska Power Company, Omaha, and chairman of the new Lighting Educational Committee of the electrical industry, in whose organization the N. E. L. A. was largely instrumental, presented the details of the national essay contest on home lighting which is being organized by this committee. The movement will be promoted by an extensive campaign of national publicity, and local essay contests are to be organized in the different cities, under the leadership of the central-station companies, in which the school children of the grammar and higher grades will prepare essays on home lighting. The children will be provided with a plan book, a lighting primer and a series of home-lighting lessons. They will make personal inspection of the lighting of several homes and will submit essays, each accompanied by a pictorial suggestion for the proper lighting of the model home. The winners in the local competition will be contestants in a national competition, the first prize for which will be a fifteen-thousand-dollar house which will be erected on any lot provided by the winner. Two other houses are among the prizes as well as scholarships and educational tours.

Public Relations and Good Citizenship

An address was made by Charles Aubrey Eaton, president of the American Educational Association, on "Public Relations and Good Citizenship," which drew forth frequent and loud applause not only because of the eloquence of the speaker but because of his fidelity to fact and conditions. Utilities, declared the speaker, because of their quasi-corporate nature constitute the biggest citizens in their respective communities and must therefore be the best citizens. This involves not only knowing and discharging duties but knowing and defending rights. If utility representatives have not the stamina and courage to defend their rights by showing the public that they are founded on the principles on which the United States was founded, all which stands for individual service and individual reward may be submerged in the present conflict of ideas by socialism or some other scheme which plans to make every one rich by making every one poor. This is particularly true because public utilities stand as an open door between what is truly private ownership and government ownership.

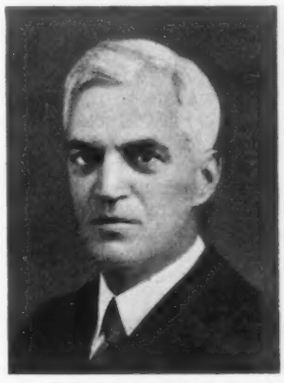
As a means of removing misimpressions and misinformation Mr. Eaton enthusiastically indorsed the activities which are being carried on by the Public Relations Section.

B. C. Forbes, editor of *Forbes Magazine*, minced no words in presenting his opinion why utilities in certain sections of the country do not enjoy such good public relations as those in other sections. He claimed that it is due to the fact that the utility executives in certain sections do not take part in the community life and make the public look upon them as real public servants and benefactors.

Enlightenment of Public by Colleges

Must Teach Economic, Social and Political Problems of Modern Business—Fundamentals Being Compiled in Textbooks and Teaching Methods Developed—Educators' Viewpoints

SO LITTLE information on public utility financing, management and operation has been available in textbooks and in the curricula of educational institutions in the past, said H. T. Sands, chairman of the Public Relations Section, at the session Wednesday, that the work of the committee on co-operation with educational institutions is looked upon as the most promising public relations activity of the N. E. L. A.



J. C. PARKER
Chairman Committee on
Co-operation with Educational Institutions

Co-operation with Educational Institutions

The committee on co-operation with educational institutions, John C. Parker chairman, has now in production an authoritative textbook on public utility problems which is the joint effort of an eminent professor of economics and one of the leading executives in the central-station industry. The book will be available within a year. The committee recommended the establishment of a graduate department for the study of public utility problems at the School of Business Administration of Harvard University. The plan has received the indorsement of the Public Relations Section and the executive committee of the association and waits now upon the raising of a fund of $30,000 a year for three years for the maintenance of the course, which will be under Prof. Theodore Howard Dillon.

Steps have also been taken to arrange for the pursuit of research work at the plants of representative neighboring central stations by professors of economics and business administration in leading colleges.

Serious thought has been given to the problem of introducing the study of public utilities into the curriculum of the secondary schools, but it is questionable whether it will be expedient to attempt anything along this line at once. With the co-operation of the educational committee, however, a series of textbooks is being prepared for the use of classes in economic science in the high schools of the country. This book will embrace the consideration of the modern public utility.

Higher Educational Institutions and the Public Utility

Education in the past has emphasized the technique or technical side of business conduct, but development has now brought about the problem of education regarding some of the intangible elements, pointed out by Prof. C. O. Ruggles, Ohio State University. If such education is not conducted, the present high efficiency of engineering will be largely offset by economic inefficiency, the speaker said. If some of the fundamentals of utilities are embodied in textbooks which can be taught in schools, utilities will not have to spend so much time in securing what they are entitled to.

Public Utility Courses at Harvard

The basis on which the School of Business Administration at Harvard will carry on its public utility educational work was outlined by Assistant Dean Donald K. David, who explained that this work would be conducted entirely as a graduate school. No claim is made to develop executives, but with the two years of instruction which will be given the opinion was expressed that men will be provided who can start at the bottom of industry with basic principles and sufficient orientation so that they will be better prepared to develop into executives than if they had not attended the courses. The case method of instruction, which has been employed

in law schools, will be used to develop straight thinking in arriving at decisions. Prof. Theodore Howard Dillon, head of this new school, will spend his first year in gathering cases from companies all over the country. Teaching methods, textbooks and teachers are being prepared for other schools which may wish to engage in similar work. The social, legal and economic aspects of business administration will be considered chiefly during the first year, and management, rates, service and customer relations the second year. Research will also be conducted. In preparing the case book it is expected to spend $175,000.

Utility Courses in Smaller Colleges

That the hurdles which utilities will encounter in the future are not technical, but economic and social, was emphasized by Dr. Murray Bartlett, president of Hobart College. The critical question before the world at present, it was pointed out, is whether public ownership is to be substituted for private ownership. The question is an economic and social one. In the speaker's opinion, public ownership can do nothing but make for waste and inefficiency because it will have the blight of politics and will remove from industry the great impetus furnished by initiative, without which civilization could not have progressed as far as it has. To develop the correct attitude toward business it is necessary to educate the public regarding the human relations of business, which can only be brought out by a study of the growth of civilization as shown by history, ideals of intercourse as typified in literature, economics, psychology and ethics. Liberal arts colleges are the logical medium for promoting this function, Dr. Bartlett contended.

Public Education and Public Utilities

Economic laws are as unknown to the general public as the meaning of the hieroglyphics on King "Tut's" tomb, declared Assistant Dean John T. Madden, School of Commerce, Accounts and Finance, New York University. If they do not become better known, there may be a serious or even complete breakdown of the social and industrial structures of the world, the speaker feared. The trouble, as he outlined it, is that social science and law lag very far behind social action. Too often expedients are adopted instead of searching for the principle that applies. It is far better to submit to some initial sacrifice than adopt expedients, and it will be found cheaper in the long run.

While he recognized the dissemination of more complete information about utilities as an important means of bringing about better public relations, Dean Madden expressed the opinion that the most influential factor is the distribution of utility securities among the public since it induces thrift. Once the general public is taught to accumulate and invest money it will begin to learn something about economics such as the flow of capital toward the higher industries and the rights of private property.

Selling Securities to Public a Half Job

Must Establish Permanent Partnership Alliance—Means of Maintaining Democracy—Establishing Better Understanding and Localizing Interest—More Companies Urged to Participate

SINCE the future of democracy in this country depends so largely on the extent to which wage earners are induced to become investors in private enterprises, H. T. Sands, chairman of the Public Relations Section, in opening its last session, expressed the belief that the distribution of utility securities by more companies throughout the United States will do more to maintain democracy than anything else.

Customer Ownership

M. R. Bump, chairman of the customer-ownership committee, reported that that out of a total of $750,000,000 which has been raised for financing the construction programs of the central-station industry, approximately $250,000,000, or 33 per cent, has been raised this year through the sale of securities to customers. The committee presented an elaborate, detailed report of the customer-ownership activities of 185 central-station companies, this being twenty-nine more companies than reported last year. The report showed a wide field for the further development of customer ownership, since there are approximately 1,000 class A members in the association.

The cost of selling securities to customers still engages the attention of the industry. The results in the last two years have shown that it is possible gradually to reduce the cost of selling to levels that are entirely conservative and satisfactory. The committee recommended that a monthly bulletin on customer-ownership experience and progress be published by the association to aid in the education of utility companies and promote better methods of conducting this work. The following summary gives a graphic picture of the present status and trend of customer ownership, as gleaned from the report:

Total population of territory served	$51,414,693
Total number of customers	10,887,019
Gross earnings of combined companies reporting	777,173,965
Stockholders obtained through customer-ownership plan	652,900
Shares of stock sold through customer-ownership plan	5,047,407
Percentage of stockholders obtained through customer-ownership plan to customers	5.9
Percentage of sales on deferred-payment plan (average)	34.6
Ratio of stockholders to population served	1 to 78
Average cost of selling, per share	$4.60

SUMMARY BY YEARS

Year	Stockholders Obtained	Shares of Stock Sold
1914	4,044	92,310
1915	4,357	57,130
1916	3,681	38,183
1917	8,242	82,007
1918	5,186	42,388
1919	19,872	194,021
1920	53,063	454,139
1921	118,544	830,222
1922	156,725	1,450,707
1923	279,186	1,806,300
Total	652,900	5,047,407

MILAN R. BUMP
Sees a Sales Prospect

How Pacific Coast Sells Securities

Since 1918 the Southern California Edison Company has increased the number of its shareholders in California from three thousand to seventy thousand, according to John B. Miller, president of that company. At first the movement was undertaken to raise money, although securing customers as partners and developing good will eventually became the chief motives.

First of all it was realized that the gospel must be told at home, so every official, department head and as many employees as possible were induced to purchase stock by allowing them to subscribe for any amount up to ten times their monthly salary and permitting them to pay for the stock on the installment plan at the rate of 7½ per cent per month. As a result of holding meetings of all employees in department groups to explain the securities, fully 90 per cent of them subscribed to securities in one year and a half. Employees were then told the value of distributing the stock among the public, sales schools were established, teams organized and quotas assigned, publicity was gained, and the employees were launched on the citizens to enroll them as partners. For each subscriber secured employees were paid one dollar,

in addition to which they were paid 50 cents and 25 cents per share for cash and credit sales, respectively.

To help acquaint the public with the utility and reduce sales resistance, moving pictures of construction activities and road shows illustrating the application of electricity were conducted.

By showing the value of thrift, local manufacturers and factories were induced to allow addresses before their employees and solicitation of subscriptions during working hours. To make the investment in securities unburdensome to investors of small means arrangements were made so that securities could be sold at any time, and the stockholders are allowed to borrow money for home building on the securities up to 90 per cent of the equity involved.

Customer Ownership from Viewpoint of Regulators

The establishment of a deeper sense of individualism will lift business and politics to a higher plane, declared Judge W. D. B. Ainey, chairman of the Pennsylvania Public Service Commission. For this reason customer ownership has much to commend it, since if individuals are lifted out of their local limitations they will respond to a broader appeal. Public utilities are absolutely essential to the wellbeing of the country, Judge Ainey emphatically stated, because they are rendering a great service without which the country cannot progress. Sale of securities to the public should enable the purchaser and the utility to acquire a better understanding of each other's problems. This, he considered, is the chief value of customer ownership. It is not in establishment of more regulation, but in the moral uplift of the public that the greatest success may be expected to come and customer ownership is one way of getting this uplift.

Political Ownership Versus Popular Ownership

Popular ownership is a means of localizing interest of the public in utilities and is an excellent substitute for home rule, contended Louis A. Coolidge, formerly Assistant Secretary of the United States Treasury. It is in direct contrast with political ownership, which only further centralizes all activities of this country at Washington instead of leaving them to the supervision of geographic sections and thus preserving the individual liberty for which this country was founded. Since 1900, Mr. Coolidge pointed out, the number of federal bureaus has increased from three to thirty-three and the expenses from $825,000 to $850,000,000, or $200,000,000 more than the entire government administration cost twenty-five years ago. With this increase in government bureaus has grown up a great army of 600,000 employees who are setting up regulations and limitations which are only hindering business. All bureaus which are not essential to administration of the government should be eliminated and further increases avoided, he declared.

Safeguarding the Investing Public

During the past year the American public has been swindled out of one billion dollars by perpetrators of various types of fraud, Henry L. Doherty, one of the trustees of the national vigilance committee of the Associated Advertising Clubs of the World, declared. This removes an equivalent amount from legitimate investment besides robbing the public of money and confidence. If utilities wish to maintain the standing of their securities and secure the money which must be needed for further development, they should be vitally interested in suppressing this fraud, asserted Mr. Doherty, since crooks will attempt to take advantage of the favor in which utility securities stand to sell fraudulent issues. The utilities can help in this movement by co-operating with the vigilance committee.

JOHN B. MILLER
President
Southern California Edison Company

Mr. Robbins, also of the vigilance committee, emphasized the fact that anything which disturbs or undermines the confidence of the public is bad for all business and that all the classes of business should therefore have a common interest in protecting the public against fraud. The vigilance committee already has enrolled in its support federal and municipal authorities, national associations and bank executives.

Selling Utility Securities Through Full-Time Salesmen and Employees

A round-table discussion on the relative merits of selling central-station securities through full-time salesmen and employees was led by William H. Hodge, manager advertising and publicity department, H. M. Byllesby & Company, and by Percy H. Whiting, manager of the customer-ownership division, securities department, Henry L. Doherty & Company, respectively. Mr. Hodge pointed out that both methods used singly or combined have merit. Speaking on the use of full-time salesmen, with which he has had the most experience, however, he maintained that this method has the advantages of continued effort.

Mr. Whiting maintained that selling securities to employees is cheaper, does not require a permanent organization, raises money more quickly, requires less advertising expenditure (one dollar a share), gains wider distribution in smaller units, reaches citizens whom salesmen would never reach, converts employees to the value of their company's securities more effectively, improves public relations and "sells" the company to the public as well as the employees. Both methods are good, the speaker thought, but if a permanent sales staff is employed at least two employee campaigns should be conducted per year.

A combination of a permanent sales force and the sale of securities through employees was favored by Fred H. Scheel, vice-president of the Utility Securities Company, Chicago, for several reasons.

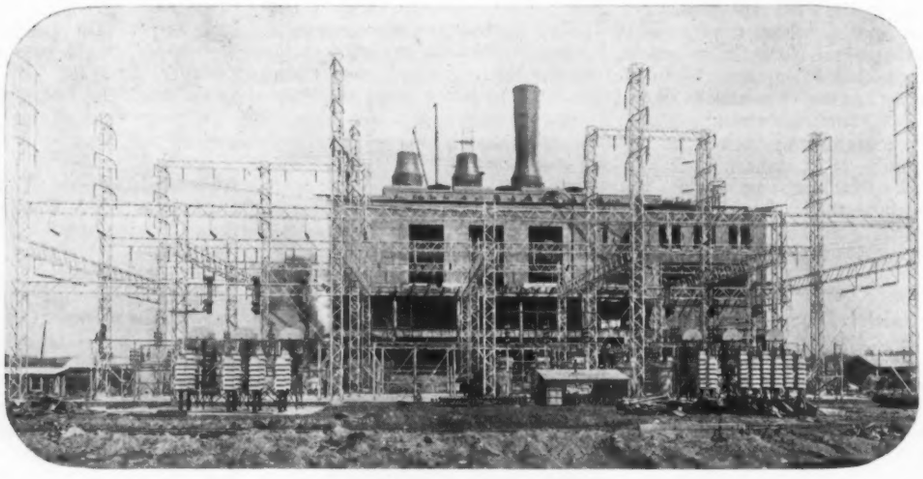
Employees engaged in various departments of the Penn Public Service Company are engaged throughout the year to sell securities, said Mr. Hill, thereby taking advantage of the employee method and of continuous effort—one of the chief advantages of full-time salesmanship. Last year three and seventeen-hundredths shares per customer were sold and ten thousand shares distributed among the public. The employees are required to do this work entirely on outside time, being paid $1 per share sold to outsiders and $2 per share for stock purchased by themselves.

Maintaining Contact with Shareholders

The Consumers' Power Company of Michigan does not feel that it has accomplished its purpose after it sells stock to the public, but develops a permanent friendly alliance and thereby makes for reduced turnover in the stock and satisfied customers as well. F. W. Hoover, vice-president of that company, said that to make real partners of the security holders the company is following several interesting practices. For example, feeling that each dividend is a means of establishing a friendly feeling, it issues dividends monthly, giving the subscriber an opportunity to substitute quarterly payments. With each dividend a personal letter signed by the general manager is sent to the subscriber telling facts which any part owner in a concern would like to know. Whenever any situation arises which might shake the confidence of the shareholder in the company an explanatory letter is immediately dispatched. Fairly detailed capitulations of how money is being spent by the company are also furnished them. Some excellent samples of advertising were submitted by the speaker, who explained that the company has sold 21,000 shares to the public and that there has only been 4.5 per cent turnover in the shares per year.

J. F. Owens, general manager of the Oklahoma Gas & Electric Company, who is a pioneer in this work, referred to similar practices and favored inviting all stockholders to company meetings. He contended that the greatest activity ahead for utilities is the utilization of stockholders for maintaining better contact with the public.

Technical Sessions



A MARKED advance in engineering policies characterized the work of the National Technical Section as it was reported and described at the convention. A very decided impetus was given to the movement for broadening the work of engineers and obtaining for them greater executive recognition. At the same time co-ordinated efforts were made to have engineers assume a wider field of responsibility in the industry and to enlarge their perspectives, in order to qualify themselves still further for executive positions. The reports presented fully carried out the idea of doing a definite and small number of tasks thoroughly and completely. The printing of reports in serial fashion met with approval and will continue to be the policy. The meetings were ably conducted by Chairman H. P. Liversidge.

Broader Viewpoint and Assumption of Executive Responsibility Urged by Engineers — Hydro-Electric Works, Cables, Overhead Systems and Electrical Apparatus Discussed in Reports—Executives Participate in Sessions

Technical Committee Reports Presented

Outstanding Accomplishments in the Electrical Art Are Discussed—High-Voltage Situation Accented and Developments in Construction Standards Recorded

THE reports of the committees of the National Technical Section were presented Tuesday afternoon before an audience that completely filled the meeting room. Each committee chairman discussed the developments in his special field of activity and outlined the general policies associated with the work of his committee. Because of the number of reports and the fact that these reports represent the unanimous opinion of the committees, very little discussion was possible at the meeting. In a few words W. C. L. Eglin stated that the committees were working continuously throughout the year and that discussion of their reports at a convention meeting would be of little value as compared with the thorough study of the printed reports with a view to their application on specific properties. He also urged that engineers should strive to attract the attention of their executives to the valuable work the technical committees are accomplishing. He complimented the Technical Section on the splendid organization which was now operating so effectively.

Accident Prevention Text Available

Accident control is mainly dependent on educational accomplishments within the organization, in the opinion of the accident-prevention committee. In many instances too much reliance is being placed on the perfection or safeguarding of mechanical equipment.

In conformity with this idea, the committee prepared a text designed to assist member companies in giving courses of study and instruction to linemen in their work and in accident prevention. It is recommended that members have group meetings of linemen, held under the direction of qualified supervisors, who shall act in the capacity of teachers, using the accident prevention course.

A detailed report of accidents that have occurred in the electrical industry during the last five years has been prepared, which shows that a large majority of the fatal accidents were due directly to electricity. Men rated as skilled workers are the victims in the majority of cases. A definite relation is shown between the occurrence of fatal accidents and the length of service and experience of the individuals.

If the records of the first-year employees are eliminated from the total of 201 cases analyzed, the showing speaks very well for the accident-prevention work accomplished. Accidents to new men can be prevented by reducing the number of new employees, by reducing labor turnover and by increasing the amount of time spent in instructing new employees.

Of the total accidents 71.6 per cent were electrical, 14.5 per cent were due to falls, and 13.9 per cent were due to miscellaneous causes. In nearly two-thirds (62.6 per cent) of these accidents the victims were linemen. About one-fifth, or 20.9 per cent, occurred to electrical workers other than linemen, that is, construction, operation and maintenance men.

The accidents are divided between married and single men as follows: Single, 39.5 per cent; married, 60.5 per cent. These data might raise a question as to the accuracy of the general opinion that married men are more careful than single men. Fifty-seven per cent of all the accidents occur to men between twenty-five and forty years of age. Very young or very old workers are injured more frequently than middle-aged ones, but the study shows that old age and immaturity were not contributory causes in the accidents considered. Of the accidents studied 43.8 per cent occurred during the first year of service.

The general conclusion was drawn that incompetence on the part of some one was responsible for a large portion of the accidents and that this incompetence might be due to inexperience, poor judgment or inattention on the

part of the injured, or to lack of sufficient instruction. The majority of the accidents appear the fault of the men injured, but the superintendent or foreman may have been negligent in allowing inexperienced men to work without sufficient safeguards or instruction. The large percentage of electric shock cases found among the 201 fatal accidents reported shows where the instruction is most needed, and the committee advocated that all employees be taught the prone-pressure method of resuscitation.

Other specifications and detailed reports by the committee covered the purchase of linemen's leather belts and web belts, traffic and street hazards, accident-prevention devices and appliances, general health promotion, and the activities carried on in accident-prevention work.

Electrical Apparatus Committee

During the year the electrical apparatus committee expects to issue reports on alternating-current low-voltage networks, alternating-current substation design, substation ground methods and practice, electrically driven auxiliaries for steam generating stations, power-factor improvements and the relay handbook. It reported that operating experience with automatic and semi-automatic direct-current substations and equipment continue to be very satisfactory. It also reported that a canvass of member companies with regard to transformer standards showed a preference for the present polarity standards. Very active work was done by the sub-committee appointed to study alternating-current low-voltage networks, and several companies have instituted this type of system during the past year.

The committee recommended that the overload capacity desirable in a steam turbine should be arranged for independently of any power-factor rating on a generator. It also recommended that 60-cycle generators should be rated at 80 per cent power factor and 25-cycle generators should be rated on the basis of 100 per cent power factor, unless otherwise specified. In addition, the committee suggested the desirability of developing a coupling for turbo-generators which could be rapidly disconnected in case of turbine trouble, thus permitting the use of the generator as a synchronous condenser.

Oil-Breaker Duty Cycles

Agreement has been reached between the electrical apparatus committee of the N. E. L. A., the protective devices committee of the A. I. E. E. and the Electric Power Club on the duty cycles of oil breakers. The approved best definitions are as follows: First, interrupting rating is based upon the highest r.m.s. current at normal voltage which the oil breaker can interrupt under the operating duty specified. The value of the current shall be taken during the first half cycle of arc between contacts during the opening stroke. Second, operating duty shall consist of a definite number of unit operating cycles at stated intervals. Third, each unit operating cycle shall consist of closing the circuit breaker, followed immediately by the opening of the breaker, that is, without purposely delayed action. Fourth, the breaker shall perform its rated operating duty without emitting flame. The condition of the circuit breaker at the end of any operating duty within its rating shall be as follows: (a) Mechanical — inspection shall show the breaker to be substantially in the same mechanical condition as at the beginning; (b) electrical—inspection shall show the main current-carrying parts of the circuit breaker to be in substantially the same condition as at the beginning. However, the interrupting ability of the circuit breaker may be materially reduced. It is not to be inferred from the above, however, that the breaker may

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Chairman
National Technical Section

be reclosed after the completion of the operating duty without making inspection and repairs where necessary. Fifth, the standard operating duty shall consist of two-unit operating cycles at a two-minute interval.

Through the Power Club a table of percentages to apply to the normal interrupting rating has been given to the committee for duty cycles imposing other conditions on a breaker.

Interrupting Capacity of Fuses

Some very interesting tests of power fuses at 13,400 volts were made by the Duquesne Light Company, which indicated a higher interrupting ability than many engineers have commonly assumed. Two types of fuses were tested, one interrupting the short circuit in air, the other interrupting under chlorine derivative. Both types of fuses gave very good results in the majority of cases. The Alabama Power Company also made some tests on high-voltage fuses of its own manufacture. For 110,000 volts a ⅜-in. diameter glass tube inclosing a copper fuse wire and filled with a form of liquid dielectric was inserted in a micarta casing 60 in. long, 1¼ in. in diameter, hinged at one end and held engaged at the other end by a latch opened by a blowing of the fuse element. The test led to the conclusion that on a 110,000-volt circuit rupturing capacities up to 3,500 amp. at line to neutral potential can be successfully obtained, and that the circuit is interrupted in a period varying between ½ cycle and 2½ cycles and the heat-absorbing ability of the liquid dielectric in a ⅜-in. glass tube 60 in. long is sufficient to quench the arc in case of current just sufficient to melt No. 24 copper fuse wire.

For the 44,000-volt fuses a micarta tube with the fuse wire alone was first used, and the conclusions reached were that the expulsion effect cannot be relied upon to clear short-circuit current unless the inside tube diameter is sufficiently small to create high momentary pressures. Also, it is advisable to have some heat-absorbing medium for this type of fuse, for example, a dry powder. It was also concluded that there is a definite relation between the size of fuse wire and the amount of heat-absorbing medium required, and for fuse wire sizes up to No. 22 copper a ⅜-in. tube 30 in. long is satisfactory. For sizes up to No. 14 copper a ½-in. tube 30 in. long is satisfactory. The circuits were interrupted during a period of time varying from ½ cycle to 3½ cycles.

The power-factor-improvement subcommittee has under preparation a very valuable report which will be published during the year.

Splendid Work of Hydraulic Power Committee

The combined reports of eight subcommittees of the hydraulic power committee were made to the convention, and three other sub-committee reports will be published as serials at later dates. A very notable work was done by the sub-committee considering control and outlet works for diversion dams and storage reservoirs. The report goes into detail on a number of typical installations and covers not only the main structures, but also the numerous items of auxiliary equipment required to make the installations complete. It incorporates the practice of most of the companies operating hydraulic plants throughout the United States and Canada and should prove very interesting to hydraulic engineers. Another sub-committee discussed pitting of hydraulic turbine runners, and the data submitted show that two-thirds of all water turbines are practically free from pitting. The remaining third have developed pitting in varying degrees, some of the smaller wheels with thin plates being eaten through in less than a year, while others of more massive construction lasted from ten to fifteen years even though pitting had been progressing throughout the period.

The one outstanding conclusion to be drawn from the experience of operating companies is that in the main the total draft head governs pitting. It is believed that the presence of a nearly perfect vacuum at any point on the surface of the runner causes pitting when this vacuum operates in conjunction with water moving at a fairly high velocity. In other words, pitting occurs where the main stream of water pulls away from the bucket.

Pitting is not confined to runners in either the high-head or low-head classes, or to high or low specific-speed wheels, or to runners having high specific speed with respect to the head. Nor is there apparent any distinction as to the manufacturer. Furthermore, pitting is not confined to any particular metal, and while there may be some choice of metal on economic grounds,

there is little choice as to pitting, at least for moderate heads.

Electric arc welding seems to be the most successful method for repairing pitted turbine runners. Welding by the oxy-acetylene process has not proved entirely satisfactory, and the chief difficulty seems to be in getting a uniform heat and in preventing shrinkage cracks.

Other hydro-electric practices discussed by sub-committees were the status of draft-tube development and lubrication methods. In addition, inspection and maintenance methods for use on hydro-electric properties were discussed pretty thoroughly, with typical examples of the systems used by operating companies.

There has been an almost universal demand from operating organizations for a bearing next to the runner with adjustment provision for taking up wear.

In the testing of waterwheels the Gibson method and the salt-velocity method were discussed, with the conclusion that both are very precise for the particular fields of application. In regard to waterwheel rating, some engineers suggest that the true rating of a waterwheel is that load at which the efficiency is a maximum and thus the waste a minimum. Such a rating appears definitely and most correctly to state the real power of a waterwheel, and it is suggested that the N. E. L. A. might well recommend the use of this basis of rating in specifications by member companies. It was suggested that purchases be made on the basis of combined results of model runner tests and of field tests of similar actual installations. No performance guarantees need be made, and there would remain for the manufacturer the natural incentive to do the best that he knows how.

The report also contained suggested methods for obtaining continuous records of water consumption at hydro-electric power plants and a discussion of the types of runners available for varying heads, including a statement by all the prominent manufacturers. Another interesting item was the calculation of the fall in pressure in hydraulic turbine penstocks due to acceleration of flow.

Inductive Co-ordination Progressing

Among the very first objects on which special effort was expended by the inductive co-ordination committee was the organization of state joint committees under the general sponsorship of the geographic division committees and of the main committee, for the primary purpose of improving and extending the co-operative relationship between electric communication and supply companies locally serving the different state territories of the country.

The sub-committee on transpositions perfected plans to publish a complete report in the near future, and sub-committees were organized to digest and review current cases.

The joint sub-committee on development and research has laid out a program addressed to the solution of problems which bear vitally on the type and cost of plants of both power and communication systems. This program will take several years for its completion.

During the year a co-operative organization was formed with the title of American Committee on Inductive Co-ordination which comprises representatives from four different groups in the electrical industry, including electric utilities, telephone and telegraph utilities, electric railways and the electric sections of steam railroads. The committee has for its object the perfection of a national organization.

Meter Committee Broadens Activities

The meter committee broadened its activities to cover all matters pertaining directly to meters, meter problems, installation practices, testing methods, general maintenance and other correlated subjects. It completed the revision of the handbook for electrical metermen and published the fourth edition of this book. There has been a great increase in interest taken by educational institutions in the giving of courses for metermen.

During the year sub-committees studied meter department organizations and submitted a report of a general nature.

The recommendations on instrument transformers as previously published have been adopted. Discussion and results of studies relative to the use, testing and ratings of these transformers were presented. Matters were discussed which have a direct bearing on meter accuracy, such as overload characteristics, lubrication, transportation, etc. The committee said that the present induction-type meters of domestic manufacture are very similar in their characteristics up to 150 per cent of rated capacity. The error due to this continuous overload is generally within 1 per cent and the temperature rise is small. Meters used with current transformers are limited to the overload capacity of the transformers, and current transformers should not be subjected to continuous loads greater than 120 per cent of rated capacity. From the investigation it was apparent that most meters are underloaded, with the exception of the 5-amp. types. It is safe to assume the capacity of self-contained meters to be 150 per cent of rated capacity, and study showed that the 10-amp. meter will measure with equal accuracy over the entire range of the 5-amp. meters. This raised the question as to converting present 5-amp. meters to 10-amp. type, in view of the growing load, as well as the advisability of purchasing only 10-amp. meters at this time.

Demand meters were treated at length from a maintenance standpoint and a detailed description of maintenance methods for the various types of demand meters was given, including principles of operation, testing methods and operating procedure. In discussing the installation of meters for low-tension installation, the committee reported that the general trend was to have service-box equipment furnished by the customer and installed by the contractor. With this method coming in vogue, it is desirable for the utilities to establish close contact with the local contractor and endeavor by rules or specifications to maintain certain standards as to types of meters, service cabinets and methods of installation. Included in the report were a treatment of instrument transformers and a list of developments that have occurred in the art of metering.

NICHOLAS STAHL
Chairman
Prime Movers Committee

R. N. CONWELL
Chairman Inductive
Co-ordination Committee

H. C. ALBRECHT
Chairman Electrical
Apparatus Committee

C. B. SCOTT
Chairman Accident
Prevention Committee

Prime Mover Committee Activities

The prime movers committee has issued several reports during the year and expects to have available to the members twenty-three more of the serial issues within the next two weeks, Chairman Nicholas Stahl announced.

Improvements have been brought about in every department of the power station during the year so that the efficiency has increased on all equipment except the condensers. Several innovations have been introduced successfully such as flue-gas air preheaters, water-cooled furnaces, new types of coal and ash-handling equipment and electrical precipitation of powdered-fuel ash. Active work is being done on a study of scale formation in boilers, and reports indicate that the tentative specifications for fuels have worked out well. During the year 1923 the square feet of boiler surface purchased for powdered-fuel installations equaled 70 per cent of the total sold during the previous seven years, and the furnace maintenance problems associated with the use of powdered fuel have been largely eliminated. The first application of low-temperature distillation on a large scale will soon be in operation. The trend in Diesel-engine manufacture is toward the two-cycle design, and one manufacturer has announced his ability to build these engines in sizes up to 25,000 hp. Other developments of importance are being brought about by the widespread adoption of higher temperatures and pressures and the greater application of the electric drive to auxiliaries. Studies are being made on lubrication in order to compare laboratory and service test data.

Important Overhead Systems Report

The overhead systems committee, through several sub-committees, followed the general procedure of previous years and investigated the following subjects of importance to the industry: Overhead-line construction, 4,000-volt distribution, 11,000-volt distribution, insulator research, 220-kv. transmission, rural-line construction, construction and maintenance equipment and methods, insulator maintenance, wooden and concrete poles, steel poles, towers and substation structures, material specifications, construction of transmission and distribution lines, and safety instructions for linemen.

The present activity in changing over 2,200-volt, two-phase or three-phase systems to the 2,300-4,000-volt, four-wire, three-phase system, with grounded neutral, was considered in an able report by a sub-committee with George B. Cornell, Jr., as chairman. The detailed advantages outlined for the proposed system consist in saving of copper in distribution systems, saving in number of feeders and saving in distribution stations, while the only disadvantages involve the use of increased voltage and, perhaps, an additional hazard to linemen. The committee concluded that the proposed 2,300-4,000-volt system would be particularly advantageous, first, where a company's distribution system has reached the point where heavy line drops are excessive, and where the character and density of loads do not warrant the expense of frequent distribution stations; second, in a territory where the present circuit load is increasing so rapidly that it would double itself, for instance, within the next five years, when a change to the proposed system would provide additional feeder capacity for such a five-year period, provided the new load

B. CURRIER
Chairman
Meter Committee

developed evenly over the existing feeders; third, in a territory where the load would have to be carried on a limited number of wires and cross-arms, the proposed system requiring only from one-half to two-thirds the number of feeders, etc., for the same kilowatt output. Of the several types of 4,000-volt systems in use, that with the grounded neutral at the supply end seems to be most favored. It is considered good practice to use some form of 2,300-volt lightning arrester on each phase wire at important points on the system and on the phase wire connected to each transformer, and in addition a 300-volt arrester on the neutral wire at each transformer. Specific methods for use in changing over distribution systems were outlined.

11,000-Volt Distribution

There has been quite a tendency toward 11,000-volt distribution, and a sub-committee with Paul P. Ashworth as chairman gave a report on this subject. All distribution lines operating at from 6,600 volts to 15,000 volts were considered as 11,000-volt lines. For the most part these lines are three-phase, three-wire, with neutral, if the system is Y-connected and either not grounded at all or grounded only at the main station or substation. Where 6,600-volt delta systems are used, these are generally being changed over to 11,000 volts Y, with grounded neutral.

For rural and urban distribution where single-phase load is served the four-wire system is favored on account of lower cost, since 6 600-volt transformers and arresters can be used. Modern 6,600-volt transformers are entirely satisfactory for use on 11 000-volt grounded wire circuits. Where three 6,600-volt transformers separately fused are used for three-phase power on the four-wire system, the common transformer neutral should not be connected to the system neutral. Where the neutral wire is carried and grounded frequently, it is the general feeling that this wire has protective value.

Except for severe conditions, standard pin-type insulators, rated by manufacturers at 11,000 volts to 13,000 volts, having a dry flashover of above 60,000 volts and a wet flashover of above 45,000 volts, have proved satisfactory on the 11,000-volt distribution lines. For industrial distribution and for substations in urban territory the smallest size-transformer is 50 kva., while for rural distribution and some urban distribution 1½ kva. is the smallest.

Lightning arresters are not generally used at all transformer installations. The use of high-priced arresters which appear to be reasonably effective can be justified only at large and important transformer installations. One advantage found on the 11,000-volt distribution system for supplying urban and rural territory is that the system, owing to its large capacity, can, under the usual load and distance condition, maintain practically constant bus voltage at all points. More than two-thirds of the companies reporting use the loop system or duplicate lines fed from different sources for supplying the important load on the 11,000-volt distribution lines. Some companies use a tap line from the main feeder lines, with sectionalizing switches on both sides of the tap point. Experience indicates that interruptions on the 11,000-volt distribution lines are largely due to defective insulators. However, it appears from specific replies that these defective insulators occur no more frequently on the 11,000-volt lines than on lower-volt age lines, and in addition, although specific data are not available, accidents on the 11,000-volt systems are at least no more frequent that on equivalent lower-voltage systems. A generally satisfactory performance is given for 11,000-volt distribution, and there is a decided trend toward an extension of this type of system.

Other Lines of Activity

The insulator research sub-committee devoted itself to closing the investigation of the effects on porcelain of temperature and moisture, and in additio made some studies of vibration and mechanical loading effects on porcelain, together with a study of the cement used in insulator assembly. Operating experiences with 220-kv. transmission lines were outlined by the sub-committee devoted to a study of this subject. The Pacific Gas & Electric Company reports that results of the first two months of operation are very encouraging. The automatic protection operated on two or three occasions. On one of these a single-phase ground was found arising from a mechanical defect; on the other occasions service was resumed immediately and careful patrol failed to disclose any trouble. The Southern California Edison Company has had satisfactory operating experience with 220-kv. transmission, and the problem now facing the company is concerned with flashovers of insulators which do very little damage and cause only short interruptions to the service. No satisfactory explanation of these insulator flashovers has been developed. Two sections of the line have been arranged for automatic balanced relay

protection in the event of a flashover, and this has worked very satisfactorily, giving only a momentary 10 per cent drop in system voltage at the time of a flashover. The whole line will soon be equipped in a similar manner.

The rural lines sub-committee emphasized the importance of good engineering on rural-line construction and a grade of construction that is good practice for urban work. The committee gave thought to the possibility of special transformer development which will produce a transformer having a low core loss, large overload capacity and insulated to stand abnormal voltages and heavy unbalancing. Difficulty has been met in obtaining a transformer of this character, but some progress has been made. The committee feels that a system using two transformers, one of small capacity sufficient to carry properly the customer's normal lighting and small-appliance load, and the other of sufficient capacity to carry the combined power and lighting loads, makes the most economical installation. For this work, however, it is necessary to have a device for disconnecting the power transformer from the line when the load is small and connecting the lighting transformer at that time and vice versa. A device called a core-loss economizer has been developed for this use and seems to give prospects of very wide application.

The sub-committee on construction and maintenance equipment and methods presented a very able report relating to labor-saving devices and practices pertaining to overhead systems, dealing with automotive equipment, tools, instruments, methods, etc.

POLE PRESERVATION AND MANUFACTURE

The sub-committee of which J. S. Ware was chairman gave a very complete report on the manufacture, use and preservation of poles. This report covered the species of woods used, the various pole defects that occur and their origin, the theory of the decay of timber, and the theory of wood preservation by the various methods. Preservatives such as salts, creosote, coal-tar creosote, water-gas-tar creosote, wood-tar creosote and low-temperature-tar creosote were discussed and their applications by the various methods outlined. The committee concluded that long experience with the preservative treatment of poles has proved without a doubt that the natural life of poles can be extended many years by proper treatment, and it cited examples and experiences of several companies.

The diminishing supply of wooden poles and their increasing cost have led to a consideration of concrete poles, both solid and hollow, for line construction. Successful processes have been developed for making each type of concrete pole, and many of them are used in the industry. In discussing steel poles and towers and substation structures, the sub-committee, of which H. W. Young is chairman, outlined briefly the present state of the art and suggested methods for construction.

Another very able report was made by the sub-committee with B. J. Barmack as chairman on methods of construction for low-voltage and medium-voltage lines. This report is a handbook of constructions for this type of system.

Additional specifications for overhead construction material were presented by the overhead systems committee, covering creosoted yellow-pine poles, untreated wooden cross-arms, cross-arm design, insulator pins, ground wire molding, line hardware and low-voltage insulators. The committee advocated the importance of a proper system of inspection and tests to be applied to the materials purchased in order to assure the customer that the specifications have been complied with. In addition, the committee assigned index numbers and made an analysis of a complete project covering specifications for overhead construction material, outlining the variations to be permitted in the specifications.

W. G. KELLEY
Chairman
Overhead Systems Committee

The underground systems committee report, presented by W. H. Cole, chairman, is given in extended abstract elsewhere in this issue.

President Walter H. Johnson addressed the section meeting briefly and complimented the committees on their valuable work. He said that the industry has grown so large and so rapidly that it was of the utmost importance for the technical men to devote all their energies to the problems encountered.

In a brief discussion of the work of the technical committees, Alex Dow stated that, particularly in connection with the activities of the meter committee and the electrical apparatus committee, the services of the rate research committee could be used effectively. In th development of measuring methods and a study of power-factor correction, rate forms could be used very effectively and were intimately associated with the technical features of the development.

Diversity in Wednesday Technical Program

Accident Prevention Work Featured — New Engineering Developments Described—Insull Medals Presented— Brooklyn System Developments

THE inclement weather did not dampen the enthusiasm of the technical men at the session Wednesday afternoon. The meeting room was filled to overflowing when called to order by Chairman H. P. Liversidge, and several interesting and valuable papers were presented on engineering subjects. A feature of the meeting was the presentation of the Insull medal for proficiency and expertness in saving lives through the application of resuscitation methods. Eight employees were awarded medals and certificates, and of the eight men six were present in person. The medalists for the year were as follows: John A. Gardner, Northern Ohio Traction & Light Company; Robert S. McCadden, General Electric Company; William W. Baker, Public Service Corporation of New Jersey; G. H. Westman, General Electric Company, Erie; Albert Wurster, Public Service Corporation of New Jersey; H. C. Sellers, Ohio Public Service Company; John G. Miller, Detroit Edison Company; G. W. Porter, West Texas Utilities Company. At this presentation Homer E. Niesz presided and dwelt upon the fact that accident prevention is a necessary and very valuable part of utility operations.

Accident Prevention

No industry stands higher than the electric industry in organized effective accident prevention work, R. F. Pack declared in addressing the session on this subject. The work is not confined to employees, but reaches the public at large. The technical developments of the work have been well taken care of, and experience has shown that from the executive standpoint accident prevention pays. A very direct money value can be placed on it in addition to the direct saving through reduction of labor turnover and loss of time through accidents or sickness. It aids morale, develops responsibility and induces an attitude on the part of employees that makes for a successful company. Executives should encourage any reasonable expense to forward the work and should maintain a permanent safety organization. Accident prevention work, declared Mr. Pack, increases earnings, strengthens the organization and maintains and improves public relations.

Budgeting Engineering Operations

Features connected with budgeting of engineering operations were outlined by Milan R. Bump. He asserted that the commercial departments of utilities had a proper field in predicting their loads and that the engineering department should be responsible for carrying out the work involving capital expenditure in the best possible manner. This best possible manner is by means of a budget system, which because of its engineering background cannot be made by the accounting department alone, and the budgets should be used by engineers as one of their strongest tools for work and as a direct avenue to executive positions. The budget is

the control board of the engineer and eliminates the unexpected in utility work. All the fundamental considerations in making a budget are engineering in character.

Budgets may be classified under two general headings, "operating" and "construction." Operating budgets should be made up very carefully, and every foreman and employee responsible for the expenditure of money should be required to estimate costs in advance. In initiating a budget system it is advisable to make them on a six months' basis at first, and all estimates should be signed personally by the man who makes them and the man who approves them. Comparisons of budgets on a yearly basis are valuable, and when the trend of results varies from the estimates a re-survey should be made to explain discrepancies.

In preparing construction budgets costs should be estimated on a monthly basis and progress reports should show the comparison of actual costs to the previously estimated costs. In these budgets actual costs of an exact nature should be used, and the use of factors of safety and tolerances should be eliminated. The actual and estimated cost figures should be given to those doing the work, and a budget should be made complete and effective by co-operating with all agencies connected with the work.

Budgeting in no sense involves the idea of fixing conditions permanently; rather, it conveys the idea of revision at any time considered advisable and gives the information which makes revisions of cost estimates advisable. As an example of the effective operation of a budget system during two years on one large operating system with more than forty properties the net income from operations was hit within one-tenth of 1 per cent. Specific instances were cited on individual properties to show how closely budget estimates were fulfilled by actual realizations. The budget also affords the executives of a utility the best basis for making plans and for operating properties on an engineering and economic basis.

Low-Temperature Distillation of Coal

In a very interesting paper V. Z. Caracristi discussed the possibilities of low-temperature distillation of coal and described the installation now 99 per cent completed by the Ford company at Walkerville. Results of certain tests show that the installation will operate up to the expectations of the designers, and although minor troubles have been encountered, on the whole these have been less than expected. Most of these troubles occurred with standard equipment and in connection with stopping air leaks in the furnace. The deposition of residue in the cracks stopped minor leaks and preliminary test runs on fuel were successful. A complete byproduct plant is installed.

In discussing this paper H. O. Lobel said that some day the central stations will carbonize all coal used and that a step in this development was the Walkerville installation, which should receive the hearty encouragement of every engineer.

Brooklyn System Described

A splendid paper describing the developments of the Brooklyn Edison Company system was presented by John C. Parker. Through several circumstances it was made possible for the Brooklyn Edison System to remodel completely its whole transmission and distribution network. This work centered in the new Hudson Avenue station recently described in the ELECTRICAL WORLD, and the result of analyses proved conclusively that 27,600-volt cables were best adapted to transmit the energy from the station to the substations. These cables were made of sector-section conductors with 350,000 circ. mils as the largest area. Having determined upon this section, a study showed that for the particular conditions encountered in Brooklyn 210 amp. was the maximum current justified. This fixed the nominal rating of each feeder and each substation transformer at 10,000 kva., and three 10,000-kva. feeders were allocated to each substation. In laying out the duct system a careful survey was made of street conditions, particularly as regards temperature, and the duct banks were widely spaced. Each consists of three tiers of five banks each with the twelve outside runs used as transmission ducts.

Each of the eight 62,500-kva. generators to be installed in the station will feed through automatic selector switches to two group buses, each carrying four feeders, and at the substations a similar arrangement has been made so that generating stations, substations and transmission feeders have been designed as a complete unit. All switching at the generating station is done at 27,600 volts, but at the substations it is done on the 4,150-volt sceondaries. In the substation each transformer feeds its own group of feeders, and the three transformers are tied to the bus through three reactors. No spare transmission feeders run to the substations, but a ring transmission feeder is used to connect all substations through special switches and reactors. Interconnection between generating stations in the system will all be made at the substations, and these interconnections will be made quite heavy and yet not involve system disturbances should faults occur because of the use of a high ratio of reactance to resistance and the specially designed layout of the system.

An interesting feature of the system is the development of the 27,600-volt cables. As installed, reservoirs containing compound are placed at cable end bells and at transformers and at certain high points, so that at all times the compound in the cable will be at a pressure above that of the atmosphere. Through careful inspection and intensive research work satisfactory cables and cable joints have been obtained.

In the discussion which followed the paper H. C. Albrecht stated that in Philadelphia it would be difficult to handle large industrial customers by the system described, and in response Mr. Parker stated that the Brooklyn system had few if any industrial customers exceeding 10,000-kva. capacity and that all others would be fed from the 4,150-volt systems. If necessary, it might be possible to feed large industrial customers directly from the 27,600-volt buses, but the number of substations in Brooklyn and the distance separating them are such that multiple feeds could be used to advantage.

Harold Goodwin asked about the practice of cutting out lightly loaded transformers to avoid core losses, and in reply Mr. Parker said that continuity of service was more important than any minor operating economies. In addition, the saving in copper losses somewhat offset the core losses under the condition outlined. He also stated that the ratio of reactance to resistance was placed at from two and a half to three to one in Brooklyn, but that this ratio was determined for the particular system used.

Alex Dow asserted that one big problem encountered in operating interconnected stations was the loss of station capacity when a severe system fault occurs. In Detroit this has been eliminated very largely by using unit areas for each station with light and easily interrupted tie lines. In discussing this aspect of the situation Mr. Parker dwelt on the semi-isolation of substations through reactance and between generators, and through the practice of paralleling at load points.

THE ELECTRIC TRUCK EXHIBIT WAS A FEATURE OF THE CONVENTION

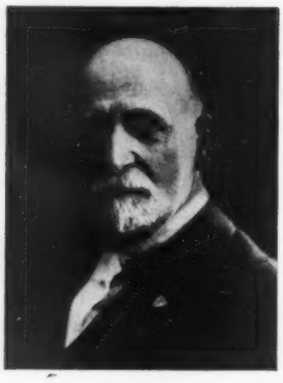
A New Conduit System

A very interesting paper was presented by E. S. Callahan on a new type of duct construction using rubber tubes and steel spacers. These tubes can be used for construction of ducts in streets or in buildings, and the practice in installing this type of system is to mount the tubes where desired, separating them with metal spacers and coring a monolythic concrete structure over them. Before the concrete sets the metal spacers are removed and at a later period the rubber tubes are withdrawn. More than 750,000 duct-feet of this type of installation has been installed successfully. A motion picture was used to show details of this new type of construction, called the Murray conduit system. In discussing this paper several questions were asked which Mr. Callahan answered. He said that a twelve-hour time interval was necessary between pouring and pulling the tubes, but that it might be possible to use a set accelerator. He stated also that if a tube was broken in removing it from the structure, the only remedy was to tear out the concrete.

Engineers as Executives

Necessity for a Broader Viewpoint on the Part of Engineers—The Important Part of the Engineer in Future Development—Joint Use of Highways

THE general problems of management of utility properties and the relation of the engineer to these problems were the major topics treated in the Technical Section meeting Thursday afternoon. An additional feature of the meeting was the introduction of Farley Osgood as the new president of the American Institute of Electrical Engineers and a notable paper by



ALEX DOW
President
Detroit Edison Company

former Justice David F. Simpson of Minnesota on the mutual rights and duties of utilities on the highways.

In opening the session Chairman H. P. Liversidge said that the section officers have an appreciation of the necessity for stressing the importance of the engineer in the development of the industry, but that the engineer must overcome any tendency to be satisfied with doing his own work efficiently while at the same time neglecting other responsibilities of a broader scope necessary for a full realization of his position.

Economics and the Engineer in Utility Management

In a splendid talk Alex Dow told how the engineers in general and the Technical Section in particular appear to the executive group in the central-station industry. He said that the executives' high opinion of the Technical Section is evidenced by the fact that they are supporting the work financially and have long done so. Not all of the activities, however, impressed the executives as being fully warranted, and there may be a tendency to go to the extreme at times.

What is needed in the industry, Mr. Dow continued, is more executives with some engineering sense and engineers with some economic sense. The economics needed are of broad scope, quite different from the school economics, which run too greatly to balancing returns against amortized costs. Executives must co-ordinate the ideas of their stockholders, their bondholders, their customers and their employees, and the big problem is to bring all these elements and their ideas together. The problem of financing in itself is a difficult one, and under all conditions financing must be timely. The psychology of the money market, however, is very peculiar. At times there is a buying market and no money available, and at other times there is plenty of money but no reason for expending it. In the utility business also it is necessary to have the money kept in the business, and for this reason utilities must deal quite fairly with money sources that can be expected to continue to put their money into the industry. At times real executive nerve is required to finance expansions on short-time funds in anticipation of refunding operations on better terms at a later time. In every case the yes or no of an executive must be based on looking ahead with a perspective obtained from surveying all conditions broadly.

Members should co-ordinate all the electrical, mechanical and civil aspects of engineering and leave to professional engineering societies the discussion of more detailed technical problems.

Another thing the engineer must understand is that technical reports should be concise and easily read and understood. Too many of those published by the Technical Section contain an excess of details and technical formulas and not enough of the co-ordinative element so necessary.

In closing his talk Mr. Dow summed up by repeating that every executive wants an engineer with horse sense about business and a commercial man with an engineering sense.

The engineer's part in the development of the industry was outlined by John W. Lieb. At the present time maintenance of the physical property and questions of public relations, finance and commerce, have become of equal importance with engineering phases. Engineers on the whole have met the new problems fairly well, said Mr. Lieb, but have fallen short on others of a character which involved human relationships and were not capable of being attacked by slide rules or formulas. They should develop a personality which will enable them to take a bigger place. The new responsibilities are heavy and diversified, and the engineer must broaden his mind and look at the business as a whole if he expects to get the co-ordinated viewpoint.

The engineer must study corporations, the speaker continued, and recognize that a corporation is a legal entity and what service the corporate form involves. He should study how money is obtained and should understand economic principles and be familiar with the general trend of the markets. A broader point of view for engineers is the essential requirement. On the legal side the engineer must become more or less at home because he is called upon to furnish legal evidence and to study or work with contracts. Employee relations, public relations,

J. W. LIEB
Vice-President and General Manager
New York Edison Company

commercial activity and rate making are other things in which engineers should be interested. Questions about which the engineer should be informed are those involving the open or closed shop, hours of labor, standards of living and civics. In the very large field of accounting the engineer must change his viewpoint and look upon accounting as the method for justifying capital expenditures and operating practices. Also, in approaching the question of depreciation a wider point of view is necessary than that contained in an analysis of the physical life of individual pieces of equipment. The utility must be viewed as a whole and the integrity of its service must be the keystone thought.

Joint Use of Highways

The mutual rights and duties of utilities on the highways were outlined by former Justice David F. Simpson of Minneapolis in a paper given elsewhere in this issue.

Commercial Sessions

CHARLES J. RUSSELL'S address, "Selling Service," analyzing the commercial situation which now confronts the central-station industry as a whole, was without question the leading event of the three Commercial Section sessions. Mr. Russell pointed out that the commercial branch of the central station should be the primary selling force of the electrical industry and held that recognition of the importance of commercial effort to the entire industry should result in a weighted average of at least 50 per cent as far as importance and authority are concerned, instead of the 10 per cent or less now granted to the commercial branch.

The national concerted effort on the part of central-station companies to improve lighting conditions in the home, store and factory received a new impetus which has long been needed. From the enthusiasm expressed both by executives and subordinates it seems not too much to expect that this will be a real "lighting year." Industrial heating was recognized as offering a field for the sale of energy which could bring larger returns than the present total connected power load in motors, and with this possibility in mind companies

Three-Day Program Brings Out the Importance of Giving More Authority to Commercial Branch of the Industry and Points to Need for Its Large Expansion to Meet Greater Opportunities and Obligations

are making intelligent surveys of their respective territories.

In the development of the household appliance load the work of the electric cooking and heating committee in making a definite investigation will result in the collection by this time next year of reliable information on the characteristics of this load. Domestic refrigeration is rapidly approaching, if it has not already reached, a point of development where the central station can undertake to push this business on a commercial basis.

By no means of minor importance to the central stations are the advances that have been made in promoting the use of electric trucks. Not only has a national organization been built up, but many local companies have found it profitable to establish truck bureaus.

Commercial Session Opens with Full House

Need for Better Selling Methods Emphasized—Importance of the Range Survey, Lighting Development, Industrial Heating and Electric Transportation Are Discussed

AT THE first session of the Commercial National Section, which was exceptionally well attended, Chairman Norman T. Wilcox summarized the work for the last year and called attention to the efforts of the section in building up the geographic divisions, which had resulted in a closer connection of their efforts with those of the National Section. He urged upon the members the importance of the duties of the geographic divisions and then called upon the various committee chairmen to summarize the work of the past twelve months.

Basis of Paying Salesmen

The study of the basis of paying salespeople which has been carried on by Howard A. Lewis is a continuation of the 1923 report. A questionnaire was sent out to member companies, from which 347 replies were received, and of this number 159 submitted definite payment schedules. These were grouped into classifications, and it developed that there are ten distinctly different payment philosophies, as follows: (1) Straight salaries, (2) straight commissions—commission either a percentage of the sales price or a fixed sum for each device, (3) salaries plus commissions, (4) commissions with guaranteed salary or drawing account—drawing accounts not a liability against future commission earnings, (5) commission with drawing account—drawing account a liability against future commission earning, (6) bonus plan based on total sales of merchandise per residential customer, (7) bonus plan based on total merchandise sales of department as a whole, (8) bonus based on net profits of department, (9) bonus based on the gross profits of the department, (10) bonus based on the increase in gross earnings of one sales period over another.

There were, of course, many combinations and variations of the different plans, but whether salesmen are paid straight salary, commissions, salary and commission, or some other form of payment, selling of the negotiation type costs about 10 per cent.

Appliance Bureau

J. L. Harvey contended that central stations should spend more effort and money on sales than on investigations, declaring that in the case of the 7 per cent of gross merchandising income now spent for advertising at least half the publicity was of such poor quality as to be valueless. He pointed out that central-station companies are unable to conduct sales on the same basis as department stores because apparently electrical manufacturers have not provided sufficient margin for the retail dealer to dispose of excess stocks. He urged upon the section the need for more detailed study of how best to educate, stimulate and supervise salesmen.

N. T. WILCOX
Chairman
Commercial National Section

W. T. BLACKWELL
Chairman
Lighting Bureau

V. M. F. TALLMAN
Chairman
Power Bureau

C. R. SKINNER, JR.
Chairman
Transportation Bureau

More information is needed by central-station companies on how to arrange and display electrical appliances to be more attractive to the buyer.

Electric Cooking and Heating

When the electric cooking and heating committee, J. F. Orr chairman, was formed last year, it was the intention to carry through a conclusive investigation and test of the electric range load on the lines of some of the companies in the Northwest. The committee undertook to gather together data on different companies, but found that it was of an extremely fragmentary nature and that in order to get satisfactory and reliable figures an entirely separate investigation should be conducted. Accordingly, the committee set about doing this, but found that the appropriation available was not sufficient to carry on the work on a sufficiently comprehensive scale. It, therefore, confined its efforts to making a preliminary investigation at Spokane, Wash., as has been outlined in ELECTRICAL WORLD of May 10, and it recommended that the incoming committee receive an appropriation sufficient to carry its work through to completion.

Electric Domestic Refrigeration

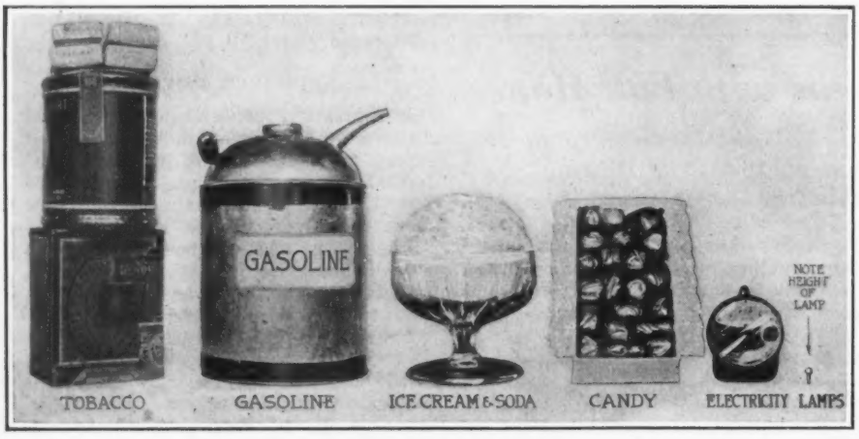
In a brief review of its subject the electric domestic refrigeration committee, H. E. Young chairman, pointed out that the most successful machines on the market at present are substantially the same in mechanical design and principles as the first models produced. Improvements have been along the lines of refinement, quality of materials and workmanship, a higher degree of precision in manufacture, a more thoroughly organized system of installation and follow-up service and details of this nature. During the last three years there has been a steady increase in the sale and use of domestic refrigeration, and at least two manufacturers claim to have 10,000 machines in service, one city alone being credited with 4,500 such machines in use. While this would indicate that the household refrigerator is rapidly approaching a commercial stage of its development, its sale is still in the pioneer stage.

Lighting Bureau

The efforts of the Lighting Bureau were briefly summarized by W. T. Blackwell, chairman, who in turn called upon his sub-committee chairmen to abstract briefly their various reports.

Commercial Aspects of Lamp Equipment

A study and analysis of the commercial aspects of lamp equipment by George H. Stickney, chairman of the Lighting Bureau committee, indicated that the trend of development of lighting accessories had been toward a concentration of efforts along proved practical pathways, with a resulting refinement in existing types. This has tended toward standardization, while at the same time improvements and developments have not been curtailed, making possible more attention to actual sales efforts without the complication of new innovations being continually brought upon the market.



COMPARISON OF EXPENDITURES FOR LUXURIES AND ELECTRIC LIGHT

Lighting of Large Buildings

The committee on the lighting of large buildings, C. C. Munroe chairman, pointed out that while many central-station companies have organized lighting departments capable of assisting and advising in the remodeling of old installations to conform with present-day standards, it is of utmost importance that they co-operate with architect, consulting engineer, electrical contractor and fixture dealer in the laying out of any general plan of illumination. The system and fixtures should harmonize with the architectural details of the structure and it is highly advisable to consider future needs in an endeavor to ascertain the lighting requirements during the life of the building. It is then possible to make recommendations which will allow for additions being made without prohibitive expense. Particular attention is called to the importance of school lighting.

Residence Lighting

That there still remains a great deal of work in the field of residence lighting is indicated by surveys made by the committee, Norman MacDonald chairman, showing not only that one-half of the houses within reach of central-station lines are unwired, but that the majority of the houses which are wired are underlighted. The committee made a study of the methods by which this condition is being met by some central-station companies. Letters from about fifteen companies indicate that where better lighting is being fostered actively such efforts may be classified in the following three groups: (1) Wiring of unwired houses. In large communities this is being accomplished through co-operation with local contractors' associations and in smaller cities through a wiring department of the central-station companies. In both cases the central-station finds it necessary to offer time payment inducements. (2) Encouragement of proper illumination

of residences under construction has been most successfully accomplished by staging electrical home exhibits in which the adequate utilization of electric devices is demonstrated. Free illuminating engineering service to architects and builders and campaigns for the sales of portable lamps have also aided materially in raising this standard of residential illumination. (3) The modernization of houses already electrically lighted has been a serious problem for a number of years, but an entering wedge appears to have been found in the kitchen-unit-lighting campaigns which have been so generally conducted during the last year. This movement has been very popular, and there are 130 known companies actively engaged in this work. Up to April 1, 1924, it is estimated that 350,000 kitchen units had been sold throughout the country.

Spectacular Illumination

In spectacular lighting, A. S. Dickerson, chairman of the committee, said while there is a broad field of application, each installation must be treated as an individual case. There are great possibilities of more widespread applications, and such lighting has a peculiar value as a promoter of good will between central stations and the public and as an advertising agency for the entire electrical industry. Some of the outstanding opportunities for this type of illumination are presented by the floodlighting of buildings, statuary and monuments, flags, pageants and carnivals, fireless fireworks and steam effects, electric fountains, interiors such as ballrooms, meeting halls and for natural scenery like waterfalls, caves, etc. The report illustrated many instances of spectacular illumination.

Electric Traffic Control Signals

An interesting paper was presented on the increasing use of traffic control signals. With the increase on the streets and thoroughfares of closed cars, noisy trucks and higher-speed travel, audible signals for controlling traffic prove entirely inadequate and electrically lighted and operated visual signals generally are proving much more efficient. The wide variety of signal equipment is available for both day and night use under almost any condition of traffic. Electric light and power companies can to good advantage foster the installation of traffic signals and thereby gain the good will of the public through its assistance in bringing about greater safety on the streets. The committee's reports contained illustrations of a number of typical installations using different manufacturers' equipment.

Decreasing Cost of Electric Light

An analysis of the cost of electric light by Henry Schroeder and O. P. Anderson showed that it costs today less than 5 per cent what it did in 1880, when the incandescent electric lamp was first put on the market. Electric light is one of the few commodities which are materially cheaper in 1924 than they were in 1914. This fact should be particularly gratifying to the central-station industry in view of the fact that during this period cost of labor and material showed an increase while the demand for energy in many cases has exceeded the available capacity. It is believed that a more widespread knowledge of these facts on the part of the public will increase good will toward the industry and also stimulate the greater use of electric light to the advantage of both the industry and the public.

Committee to Promote Central-Station Illuminating Engineering

This committee, Preston S. Millar chairman, called particular attention to the importance to public welfare of good illumination and cited several instances of scientific investigation which showed how ocular behavior improves with proper lighting. Statistical analyses showing the hazards of poor illumination, together with service trials of a better system, aided the committee's work. An account of superior results under good illumination was included in the report. A training course for central-station men engaged in or about to take up lighting work was described and recommended with the view to making available in the communities served expert knowledge of the new lighting developments.

Street Lighting

W. T. Dempsey, chairman street-lighting committee, reported a very noticeable tendency toward the use of increasing intensities for street and rural highway illumination. He declared that the public is coming to realize the necessity for better lighting of public thoroughfares as a means of reducing accidents and speeding up traffic at night.

ONE AISLE OF APPLIANCE AND LIGHTING EXHIBITORS

Power Bureau

V. M. F. Tallman, chairman of the Power Bureau, explained how the bureau had been organized to decentralize its work with the view to putting more responsibility in the hands of geographic sections. Much of the work of the Power Bureau has been of an educational nature in promoting industrial electric heating schools in co-operation with manufacturers, and Mr. Tallman paid tribute to the Westinghouse, General Electric and Cutler-Hammer companies for their very material co-operation in this respect. He urged upon executives the need for enlarging the personnel of power sales departments in order that they may better cover the ever-growing field of new power applications.

Industrial Heating

The industrial heating committee, Wirt S. Scott chairman, devoted a considerable amount of its attention to the instruction of power sales engineers in the application of industrial electric heating and in the general dissemination of data on this subject. The efforts of the committee to convince the central-station executives of the desirability and practicability of the industrial heating load are bearing fruit and are reflected in the number of men whom contral-station companies have sent to the industrial heating schools conducted by the committee in conjunction with manufacturers of this apparatus. This committee is engaged on a three-year program which it is in the midst of working out, and one of the constructive developments during the ensuing year will be the publication of data covering the revenue, energy consumption and general nature of typical industrial heating installations.

Transportation Bureau

In reporting the progress made under the electric truck business development program, the Transportation Bureau, Charles R. Skinner, Jr., chairman, found that greater progress had been made during the last twelve months than ever before in the history of the electric truck industry. For the first time it was felt that business men the country over are facing and admitting the facts of delivery costs, and this is leading to a new and unprecedented acceptance of the electric truck on routes of from one to forty or fifty miles daily. Central-station companies are no longer lethargic concerning the importance of this load. Rather, local interest in every section of the country indicates that electric truck bureaus will be established by many companies during the coming year.

Chief among the activities of the bureau during the past year was the operation of the electric vehicle school under the chairmanship of E. S. Mansfield of the electric vehicle school committee, in co-operation with the manufacturers and Fred R. Jenkins, chairman of the educational committee.

Four sessions of the school were conducted. Another important development has been the national publicity activities carried out under the name of the "electric truck business development program" and in co-operation with the Society for Electrical Development. Much valuable and interesting information has been collected and broadcasted by this method.

Probably the most significant and hopeful development is the fact that manufacturers are showing a decided inclination to go more than half way in the sale and service of trucks, and central-station companies, on the other hand, are again showing interest in the value of this load.

Finally Mr. Skinner recommended that central-station companies generally establish an automotive accounting bureau for the purpose of collecting data on the cost of operating the trucks in their own service, not only electric but gasoline as well, in order that accurate information may be available.

Customer Relations

The work of the customer relations committee, Harold Wright chairman, was given over to the study of methods of routine work which can be adopted by companies to improve their relations with customers. One of the outstanding recommendations made by the committee during the last year was that instead of removing meters on final reading they should generally be allowed to remain installed for a considerable period in premises which are unoccupied, so that succeeding customers can be supplied by the simple operation of reconnection. This method has worked out very satisfactorily with a number of companies. It was also recommended that instead of having the customer sign the application before connection is made it is in the interest of better public relations to connect up a customer as soon as possible after he telephones or makes his desire for service known and have the application signed when the connection is made.

Commercial Development Needs More Force

Lighting, Transportation, Household and Industrial Applications Call for Greater Administrative Ability and Executive Recognition —Ten per Cent Authority Should Be Fifty

BECAUSE of the great interest in the subjects to be discussed, the second Commercial Section session was held on Wednesday in the main ballroom. Chairman Wilcox emphasized the importance of the meeting and called particular attention to the fundamental nature of the speakers' analyses of their problems.

Increasing the Lighting Load

In a paper entitled "Promoting Better Illumination" Preston S. Millar pointed out that the success of increasing the lighting load on the lines of central-station companies was predicated entirely upon the one word "if." The central-station companies as a whole have a great opportunity before them to improve the ocular welfare of their residential customers, improve traffic conditions, facilitate the delivery of freight and aid merchants by supplying better lighting facilities, all of which will add materially to the central-station revenue and all of which can be secured by the central-station companies if they will go after the business intelligently. He declared that the only thing that remains in the way of companies obtaining this business is their lack of trained lighting men who can apply in a practical manner the new developments in illumination. Because there are no such men available now the Lighting Bureau has arranged a course of instruction which will be conducted this summer for the benefit of central-station managers desiring to send men to such a school. The time and expense required to complete this course will be comparatively small, and it will supply these men with information that it would otherwise take years to acquire. He urged upon all central-station men who so desire to register one or more employees for the course.

R. R. Young, Newark, N. J., cited the experience of the Public Service Electric Company, stating that two years ago a lighting engineer had been engaged who had built up a department which has gained exceptional results in building good will for the company and increasing revenue from energy sales. A. C. McMicken, Portland, Ore., heartily indorsed the proposed lighting school and declared that his company's fourteen years' experience in maintaining a lighting specialist showed a marked improvement in public relations through enabling the customer to get full value in lighting as compared with what he pays for in kilowatt-hours. G. E. Miller, Cleveland, said that there was no more reason for central stations to send out inexperienced power sales engineers than there was to use inexperienced lighting men, yet many companies were paying little attention to lighting sales. He also urged that every company send at least one representative to the lighting school.

Electric-Truck Testimony

Robert E. M. Cowie, president of the American Railway Express Company, in an address on "Why the American Railway Express Company Uses 1,800 Electric Trucks," presented a strong argument for the use of electric vehicles in their proper field of application and cited the experience of his company in the application of this means of transportation. Mr. Cowle's address is abstracted at length elsewhere in this issue.

Electricity in the Home

Speaking on the application of electricity in the home, Elizabeth MacDonald, household editor of the *Modern Priscilla*, declared that modern women have been driven out of the home because of the arduous nature of home making, which, she said, is the hardest job in the world. She said that the only way to re-establish American homes is to make the hours of work and the fatigue incurred no greater than those of the union laborer. It will be necessary to make home work as easy and attractive as anything else that a woman can do, and electricity is the only thing that can accomplish this end. In this respect the electrical industry and particularly central-station men are faced with a 100 per cent responsibility for solving the problem, but she believed they have at their command equal facilities for doing so.

She called attention, however, to the fact that the solution of the problem should begin in the home and work back to the manufacturer, rather than as is now being done, which appears to be the reverse of that process. There are fifty-five different jobs which a woman must do as part of her home-making work, and Mrs. MacDonald urged that a careful analysis be made to find which of these are the most difficult. She cited the specific case of dishwashing, declaring that women are not tired by this duty but they are tired of it. As soon as a dishwasher is developed which really works and will do the pots and pans, there will be a second Henry Ford in the electrical industry.

Much has already been done in the development of household labor-saving devices, but the speaker thought that there had been a lack of intelligent education and suggested that there should be an intensive campaign in this direction. This should be directed along two lines, first, for mature women who, while they are anxious to use these devices, have a certain amount of fear of them and need to know more about their mechanical operation. It was suggested that women's clubs and other agencies be used for this purpose. The second method should be a course of instruction of the children in schools who will be the home keepers of to-morrow. Mrs. MacDonald urged great care in selecting those who are to carry on this educational work, pointing out that the experienced housewife will not take the advice of the young domestic science expert who has no practical experience in housekeeping and motherhood. For educational work in the public schools consideration of this factor is not so necessary. She also cautioned against the practice of overselling appliances, for she has found many women who were disappointed in the performance of appliances after they were put in service. The necessity for *ex post facto* service was urged.

Present location of convenience outlets in the baseboard should be banished and they should be made real convenience outlets. This device, she said, had been invented by a sex that never wore corsets, and women want things not only convenient but beautiful and ornamental as well.

In order that the more rapid electrification of the home might be accomplished, Mrs. MacDonald declared that there should be a compulsory period of housekeeping for the men of the household, which she felt positive would result in the development of satisfactory devices.

Sales Management

In an address on "Management as Applied to Sales," Fowler Manning, director of sales of the Hoover company, traced the present commercial development through three stages. The first was production, or the stage when a man was required to be able to know how to make an article when the ultimate user came to him and asked for it. Volume of production was not then an item, and it was only after industries began to grow that large manufacturing institutions came into being, calling for large-volume production to reduce cost. This brought about the second or financial stage, entailing the consolidation of many factories and increases in capitalization. The third stage is that of selling, and it now confronts all industries. Mr. Manning pointed out that it is just as necessary to apply the fundamental principles of well-ordered economical production in the selling department as it is in the manufacturing branch.

While it is necessary to have quantity

F. A. KETCHAM
General Manager
Western Electric Company

production sales, it is even more essential to know accurately what the elements and processes are. They must be based upon a careful analysis of the market and then a definite sales program can be formed. The speaker pointed out that the success of the many chain stores now in existence is based entirely on this. Because of these practices business grows or expands in proportion to its ability to furnish management in adequate quantity and quality to meet the needs of that growth. The sales manager must accept at least three-quarters of the responsibility for the result gained by his salesmen, but in turn he owes the sales force a very considerable sum. The salesmen must be furnished with a product properly designed and priced, and there must be a real need for that product. Finally, a method of selling must be supplied which if carried out will result in sales in satisfactory volume.

Failure to take account of any of these factors will detract materially from the success of any selling plan. Mr. Manning pointed out that in the production department of a factory 20 per cent of the personnel is of a managerial or supervisory capacity. While perhaps not so great a percentage is needed in the central-station industry, an adequate quantity and quality of men in managerial and administrative capacities is essential.

Radio and the Central Station

In discussing the potentialities of the third and latest member of the radio family — space broadcasting — David Sarnoff, vice-president of the Radio Corporation of America, declared that it has an almost unlimited field because of the extended practical applications of radio to the home and to the fireside. Mr. Sarnoff drew a striking parallel between the growth and development of radio and of the central-station industry based on the fact that the activities of both have been so closely identified with home life.

To give some idea of the volume and importance of the radio business, Mr. Sarnoff quoted some interesting statistics. For the year 1923 alone $175,000,000 was expended for receiving material and accessories of all kinds. It is estimated that three million radio receivers are in daily use, rendering entertainment to ten million listeners.

While the operation of radio apparatus has been greatly simplified of late, Mr. Sarnoff declared that the storage battery, the battery charger and even dry batteries should not be the sole means of power, when a source of lighting current is available. Present indications point to two methods of operating receivers in the near future. The first type is the home receiver, which will draw its vacuum-tube energy through a current-supply device operated from the lighting circuit now supplied by the central-station company. The second device is the rural home receiver or the portable receiver, which obtains operating power from storage or dry batteries. The consumption of central-station energy is already being greatly increased by radio. Of the two million storage-battery-type sets, by far the larger proportion employ three vacuum tubes and many utilize from five to ten tubes. The average radio enthusiast charges his battery twice a month, and it seems safe to estimate that central stations are receiving a monthly revenue of 80 cents per installation, which gives an estimated total revenue per year of $20,000,000. Based on the present rate of increase in population and growing popularity of radio, it is estimated that at the end of five years central-station revenue from this source will be about $50,000,000 per year.

As the central station has already developed a type of home service unique in American industrial history, it can properly undertake the distribution of radio equipment, he continued. While the volume of sales through this channel of distribution cannot be estimated, central-station companies having a merchandising department should easily develop a substantial and profitable business in this field. Mr. Sarnoff estimated that the addition of radio to central-station activities would within a reasonable period of time result in an increased revenue of about $75,000,000 per year for increased power consumption alone, not including profits derived from radio sales and service.

Fifty per Cent Authority, Not Ten

In a masterful analysis of central-station commercial conditions entitled "Selling Service," Charles J. Russell, vice-president of the Philadelphia Electric Company, declared that the proper recognition in all matters of policy and development should result in a weighted average of at least 50 per cent for the commercial branch of the central-station company as far as importance and authority are concerned instead of the 10 per cent or less that is now granted. Mr. Russell's address is abstracted elsewhere in this issue.

Discussing Mr. Russell's paper, J. G. Barry said that if the central-station companies are not successful in expanding and selling their service, there will be nothing left for the manufacturers to do but supply renewals. While it is true some manufacturers do not follow up on apparatus after it is sold, there is a marked tendency on the part of most manufacturers to check up on their material. He felt that they can do much toward assisting in the de-

T. O. KENNEDY
Vice-President
Ohio Public Service Company

velopment of new devices by this follow-up method and can be of material assistance to central-station companies in the rendering of an advertising and sales service.

H. D. Shute declared that in his opinion the commercial branch of the industry should receive a weighted importance of at least 50 per cent in importance and authority. The strides which have been made thus far will seem like pigmy steps when compared with the future. However, if these results are to be accomplished, the commercial branch of the industry must be expanded to meet its greater obligations.

That the electrical manufacturers must go farther in selling the electrical idea to the public was the contention of F. A. Ketcham, who thought that this opportunity had been largely overlooked. He urged that manufacturers strive for a higher standard of appliances, stating that 25 per cent of those now sold go off the line because of breakdowns from one cause or another within a year after they are sold.

T. O. Kennedy closed the discussion by asking the question, "Can we be proud of belonging to an industry that is forty years old and still boast of being in our infancy?"

Commercial Opportunities Loom Large

Addresses Outlining Fields for Electric Transportation, Domestic Refrigeration, Lighting Campaign and Industrial Heating Make Up Symposium of Third Session

IN A SERIES of addresses at the third commercial session on Thursday four of the outstanding fields for development by the central-station companies were discussed. The progress that has been made thus far was gone over briefly and the possibilities and plans for the future were outlined.

Selling Electric Trucks

To show how widely the interest in electric transportation has spread over the country, H. E. Sandoval related the steps that have been taken on the Pacific Coast to promote the use of electric transportation. He outlined the ways and means adopted, particularly in San Francisco, by the Pacific Gas & Electric Company for an aggressive selling campaign, the principal features of which have been the creation of an electric truck bureau by that company. There has also been formed an Electric Transportation Association in San Francisco and a truck bureau has been made a part of the Pacific Coast Electric Association. Although these activities have only been operative since January 1 this year, there have been twenty-seven different installations of electric trucks totaling sales of 169 vehicles.

W. E. Clement asked what the total income to the utilities which charge the fleets of 1,800 electric trucks belonging to the American Railway Express Company is for that service. Charles R. Skinner, Jr., answered the question by stating that it is between $500,000 and $600,000.

Domestic Refrigeration

A valuable collection of data on electric refrigeration was abstracted by T. I. Jones, who pointed out that the only reliable information which should be accepted was that produced in the customer's premises. He emphasized the fact that any laboratory test would be far from representative of true conditions because the practical side of the question was not represented.

By means of lantern slides he showed a series of charts taken from recording thermometers, recording ammeters and recording wattmeters. These instruments had been installed under normal conditions on refrigerators in actual use in homes. From the results obtained in the tests made, it appeared that the average energy consumption per week for the time of year was 10 kw.-hr. This average did not include one machine which showed an energy consumption of 17 kw.-hr. per week. In all there were six refrigerators included in the test.

Mr. Jones then pointed out that under what would probably be average conditions the domestic refrigerator had a demand of 300 watts and would probably consume in the neighborhood of 800 kw.-hr. annually. At an 8-cent rate for energy this would earn for the central-station company an annual revenue of $64, or at the rate of $213.33 per kilowatt of demand. He pointed out that this was by far the highest return per kilowatt of installed station capacity of any appliance and was higher than for any other class of business. That domestic electric refrigeration is satisfactory is borne out by letters he had received from seventy-three users in Brooklyn, fifty-six of whom found their refrigerators very satisfactory. Sixteen had experienced minor troubles and only one was generally unsatisfied, and this trouble has since been remedied to the customer's entire satisfaction.

Mr. Jones said that the domestic electric refrigerator carries probably the greatest potentialities for development of all domestic appliances because of the high gross revenue per kilowatt of demand. Desirable as this business may be, however, he emphatically declared that no electric refrigerator should be placed on the lines of the central-station company unless the manufacturer of that refrigerator has an accredited representative in the territory who can and will maintain service on the device for at least one year after its installation. To permit of any other arrangement would be running the risk of setting back the general use of domestic refrigerators for a long period of time, as was the experience of the electric truck makers.

The present cost of the individual refrigerator is too high for the average customer, and this is one thing in the way of its more rapid adoption, said J. L. Harvey. He urged that central-station companies show a little sporting blood and help the manufacturers push this device so that they can get to a point of quantity production sooner and thus lower the selling price.

R. H. Tillman had found that one of the chief difficulties with domestic refrigerators in the past was the poor quality of box which had been used. He felt that this was of almost equal importance with the mechanical part of the machine.

Mr. Jones closed the discussion, making it a point to urge upon all commercial men the necessity of interesting their executives in the possible field for commercial development, calling attention to the fact that one of the outstanding executives was present at this meeting.

FRANK W. SMITH OF NEW YORK ALMOST MISSED A SESSION

The Big Lighting Campaign Plan

Recalling the efforts that have been made for the last two years to obtain co-ordinated action on the part of central-station men to promote better lighting, G. E. Miller described the plan to put the story of better home lighting across to the people of the country. Mr. Miller regretted that there had been times in the central-station industry when valuable promotional effort had savored of the noise-making variety, with little or no co-operation between individual companies or other branches of the industry. He urged central-station men to get behind the present plan and work it out religiously. He pointed out that this plan can be made a national success because the use of lighting in the home is universal and every company can follow along the same lines.

He then briefly described the organization of the plan of campaign and called attention to the fact that its ultimate success depended upon the care and attention that was given to the local organization of the work in the individual city.

An appeal for a more general interest in industrial electric heating was made by Frank A. Coffin, who declared that so far as possibilities of development are concerned this field has only been scratched. He then quoted figures similar to those published in an article by Wirt S. Scott in the ELECTRICAL WORLD for May 10, showing that already central-station companies are receiving forty million dollars annually in revenue from this business. A survey that has been made by Mr. Coffin of a central-station company having a peak load of 138,000 kw. and an annual output of 511,350,000 kw.-hr. showed that 203,000,000 kw.-hr. has been consumed for power purposes. The possibilities for industrial heating applications in the same territory indicated an energy consumption of 659,000,000 kw.-hr., or that the prospective heating load amounts to more than twice the present power load.

The report of the nominating committee to name candidates for chairman and vice-chairman of the Commercial Section for the ensuing year was postponed until a later date.

Accounting Sessions

IN POINT of attendance, sustained interest in the program and renewed enthusiasm for the work of the immediate future, the accounting sessions at the convention of the National Electric Light Association broke all previous records. New conceptions of responsibility and of opportunity throbbed in the air of the meeting place from the beginning and dozens stood rather than lose the addresses and discussions.

The public aspects of the accountant's work bulked large in the proceedings. Important issues at Washington in regard to depreciation accounting were reviewed in masterly fashion. Fine co-operation in the modernization of the city accounting system at Baltimore was outlined, and increased emphasis was laid upon the value of the accountant's service in getting at the roots of the great problem of profitable merchandising.

All along the line of what might be called the internal practice of the accounting profession progress was in evidence, and the expressed need of a real system of cost accounting was offset by recorded advances in budget control, customers' records and billing, fixed-capital records and other technique. Noteworthy gains were also indicated in the relations between the accountant and the engineer, and new light was thrown upon the educational needs of the accounting profession and its opportunities for larger service.

Quicker diagnosis of the causes of operating wastes received well-merited attention. Examples of this kind of co-operation were strikingly presented and earnestly taken to heart. Encouraging report was made of the wide acceptance of the standard classification of accounts, and the opportunities before the accountant to develop better public relations with security holders, customers and employees were stressed.

Accountants' Influence Gains Steadily

Interest Increasing in Budget Control, Plant and Customer Records—Merchandising Costs Compared and Valuable Lessons Deduced

WITH the largest attendance ever recorded, the first accounting session was held on Tuesday afternoon to discuss budget control and records of varied types which in their very titles indicate how fast the erstwhile bookkeepers of the industry are becoming members of a professional calling affecting the welfare of the utility companies to an ever-increasing degree. Every seat was occupied when Chairman W. A. Jones set the ball of discussion rolling and few left until adjournment. This year the new plan was tried of devoting the first session to committee reports and the later gatherings to addresses from outside the section. This met with general favor.

Budget Committee

The survey of the budget committee, R. B. Grove chairman, was started during 1923 but not completed in time to present at last year's convention. The committee report includes an investigation of 289 member companies, of which 176 were using a budget system, 109 had no budget and four companies furnished no details. Because of the increasing interest in budgets of the continuous type the committee presented the detailed description of a continuous budget used by one of the large companies. The committee reported an increasing preference for long-term forecasts rather than the use of a short-term budget. Among the tangible results which may be obtained by this method are (1) the development of a larger viewpoint and appreciation of relative responsibility on the part of department heads, (2) an indication of unused property owned by the company which does not fit into a development program, (3) an indication of other needed real estate not owned by the company, (4) the proper collection of plans to give the most economical operation, (5) greater care in planning transmission and distribution systems, (6) an indication of the funds required to provide the necessary anticipated plant and equipment. It has been found that the task of drafting ten-year estimates is not overburdensome once the work is initiated, and its value will be apparent from the very first.

Companies using the long-term forecast budget are very enthusiastic over the results of two years' service. B. S. Rodey, Jr., Bartlesville, Okla., criticised the use of budget control as a sort of club against employees and departments, urging proper analyses of conditions by executives in studying budget reports.

Classification of Accounts and Annual Reports

The work of the committee on classification of accounts and annual reports, J. H. Lobban chairman, was confined to four principal lines: (1) Promoting the adoption by public service commissions of the uniform classification of accounts for electrical companies as recommended by the National Association of Railway and Utilities Commission-

ers; (2) securing a standard form for annual reports to public service commissions; (3) publishing a simplified classification for the use of small companies; (4) answering questions of interpretation.

Of the forty-eight states, twenty-two have adopted the uniform system. One has adopted the Federal Power Commission classification.

C. L. Campbell advocated annual report forms requiring an extreme minimum of costly statistics. E. J. Fowler, Chicago, took issue with him on the latter point, declaring that the basic statistics of operation should be included.

Customers' Records and Billing Methods

The report of the committee on customers' records and billing methods, J. F. Ford chairman, described in considerable detail four modified forms of systems of keeping customers' accounts which have been developed. Each system uses some form of machine billing.

One company has had very good success by offering a bonus to meter readers in addition to their salary for efficient work. An additional bonus is paid for extra books read in addition to their regular route, and it is possible to earn a maximum bonus of $15 for efficiency and $15 for extra books.

A sub-committee on methods and appliances in connection with customers' accounts and billing made an investigation of companies having branch offices and found that there is increasing tendency in this direction. Generally the practice is to keep customers' accounts at the central office, where all billing is done, the branch offices acting as collection, inquiry and complaint agencies. In one company only about 3 per cent of residence or apartment customers are required to pay a deposit. Another company makes a practice of refunding all deposits to customers who have paid their bills promptly over a period of one year. It is pointed out in the report that a company's contact with its customers in the rendering and collection of bills carries great potentiality for building good will.

Commenting on this report, Chairman Jones said that poor billing practice paves the way toward "rotten" public relations. Franklyn Heydecke, Newark, N. J., announced that the Public Service Electric Company is about to adopt the so-called system of "bookkeeping without books," notwithstanding the problems created by accounting in twenty-eight branch offices and a total of roughly one million gas and electric meters on the system.

J. C. Perrow, Norfolk, Va., said he used the "eliminating system" in which the customer's record is compiled after the account has been paid. The Remington totalizer has cut down the labor of making duplicate bills and has reduced delinquent bills from 18 per cent to less than 1.5 per cent.

Fixed-Capital Records

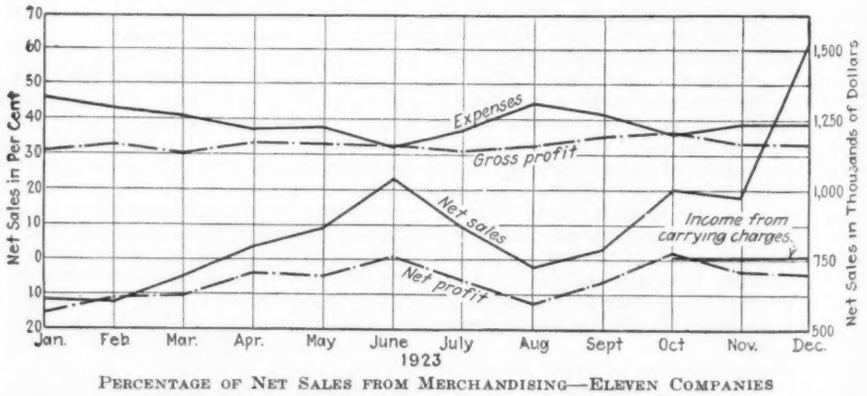
The fixed-capital records committee, M. R. Scharff chairman, presented a revision of the general instructions of the fixed-capital records system submitted by last year's committee, which provided for the procedure to be followed in initiating such a system in an operating company and for the handling of intangible fixed-capital and overhead costs. It was recommended that the committee on classification of accounts and annual reports incorporate into the classification definite authorization of and procedure for the redistribution when desired by any company of its investment in fixed capital prior to the time when it begins to follow the uniform classification of accounts.

W. A. JONES
Chairman
Accounting Section

In the discussion it was stated that two large companies are using a fixed-capital record system similar to that recommended, one or two use more elaborate records, and about a dozen reported use records of this kind in some form. The entire industry is growing more and more interested in the subject, which has an influential bearing upon taxation policies, insurance and rate problems, valuation, capital issues and retirement of plant. Several speakers questioned the cost of establishing and of maintaining fixed-capital records, and the difficulties of making a start in such work where cost data are meager were stressed. Mr. Scharff said that one company with an investment of $60,000,000 established a record system at a cost of $2.20 per $1,000 of investment, the cost of maintaining it being only 35 cents per year per thousand of investment.

Merchandising Accounting

During the past year the work of the merchandising accounting committee, P. H. Myers chairman, has been characterized by intensive work in studying the monthly reports of merchandising operation. It is hoped by this method to bring about greater standardization of accounting treatment by the several companies that will make desirable amendments to the classification of merchandising accounts. The results of the committee's investigation for the past year are summarized in the accompanying table. The chart also shows the composite treatment of the operations of all companies weighted on the basis of net sales. From the tabulation it will be seen that there is a wide variation of the different items of expense and profit for individual companies, some of which show a profit and others a loss, while the summary shows that there was a net loss of 4.4 per cent on merchandising operation.



PERCENTAGE OF NET SALES FROM MERCHANDISING—ELEVEN COMPANIES

Supplementing the report, Mr. Myers said that returns from eleven companies showed an increase in net sales of $310,000 for the first quarter of this year compared with the corresponding period in 1923. The decrease in gross

COMPARATIVE STATEMENT OF GROSS PROFIT, EXPENSES, NET OPERATING PROFIT OR LOSS, OTHER INCOME AND NET PROFIT OR LOSS IN PERCENTAGES OF NET SALES, CALENDAR YEAR 1923

	Company											Summary
	1	2	3	4	5	6	7	8	9	10	11	
Gross profit	33.6	31.9	35.5	35.8	31.4	24.3	31.7	32.5	33.4	28.9	27.1	32.9
Selling expense	28.4	17.6	16.3	15.2	14.9	6.4	19.0	18.2	17.6	12.2	3.6	20.0
General expense	22.4	8.7	11.4	11.6	15.1	8.0	14.5	31.9	15.9	8.6	7.1	15.8
Fixed charges	3.6	2.9	2.7	2.9	2.8	3.2	0.7	2.1	2.4	2.7	1.1	3.0
Total expense	54.4	29.2	30.4	29.7	32.8	17.6	34.2	52.2	35.9	23.5	11.8	38.8
Net operating, profit or loss*	**20.8**	2.7	5.1	6.1	**1.4**	6.7	**2.5**	**19.7**	**2.5**	5.4	15.3	**5.9**
Income from carrying charges	3.7	....	....	....	3.3	....	1.4	....	....	....	....	1.5
Net profit or loss*	**17.1**	2.7	5.1	6.1	1.9	6.7	**1.1**	**19.7**	**2.5**	5.4	15.3	**4.4**

* Figures in bold face indicate net loss.

R. B. GROVE
Chairman
Budget Committee

A. B. McCOARD
Chairman Payroll
Standardization Committee

J. F. FORD
Chairman Customers' Records
and Billing Methods
Committee

F. J. BRETT
Chairman Security Holders'
Records Committee

profits was 0.7 per cent; the selling cost gained 4 per cent and the net loss increased 3.2 per cent.

Payroll Standardization

Presenting its report this year, the payroll standardization committee, A. B. McCoard chairman, described in detail a system which is recommended for use by the larger companies and with some few modifications may be followed by smaller companies. This system contemplates that there be two separate departments—one for keeping time, preparing payrolls and distributing time and one for the preparation of checks and payment of rolls.

The value of a periodical payroll audit in the field was generally agreed by those taking part in the discussion. E. S. Brock, Newark, N. J., pointed out that payroll audits can be made to advantage in the generating plant as well as in the field.

Preservation of Records

In presenting recommendations this year the committee on preservation of records, Franklyn Heydecke chairman, strongly advised that the report for 1923 be read and thoroughly digested and that this year's report be tied in with it as one report. It was felt that there is not an adequate appreciation of the importance of the preservation and orderly destruction of records, and that these matters should receive more careful consideration on the part of those central-station men responsible for important documents of their companies. Attention was again called to the hazard of keeping useless records, and it was pointed out that unless some systematic method is provided for separating and removing inactive records from the active ones, not only will the former tend to become a serious fire hazard, but they will occupy valuable floor space and filing equipment, both of which ultimately mean added expense. It was strongly recommended that a definite schedule of responsibility for the destruction of records should be adopted by every company, and the committee called attention to the fact that the Department of Public Utilities of the Commonwealth of Massachusetts has issued during the past year regulations to govern the destruction of records of gas, electric and water companies. These regulations were made a part of the committee's report.

Replying to an inquiry, Mr. Heydecke emphasized the point that one insurance broker has proposed a deduction of from 25 to 40 per cent in premium on protected records, marking the beginning of a new policy in this respect. The work of the "destruction committee" of an Eastern central station was outlined, the procedure providing for the review of all recommendations and for a final judgment by the official recommending disposal of old papers, etc. It was brought out that the attitude of state commissions is becoming more liberal in reference to allowing companies to destroy old papers.

Stock Accounting

The report of the purchasing and storeroom accounting committee, E. S. Brock chairman, gave a description of the accounting procedures in purchasing and storing of materials. In the report the general subject was divided into seven parts, as follows: Ordering, purchasing, receiving and shipping, storing, issues and returns, accounting, materials and supplies purchasing. Each of these parts of the report was further subdivided into a description and analysis of the detail and routine methods which have been found successful in actual practice. The report as a whole was designed for large and medium-sized companies, but will be very useful to the smaller companies.

Standardization of Material and Supplies

Additional work by the committee on purchasing and storeroom accounting, E. S. Brock chairman, included a report covering methods of standardization of material and supplies, inspection and testing of materials and keeping of current stock catalogs. It was pointed out that a general campaign of standardization will lead to more variety of stocks, resulting in the collection of the most satisfactory material, speeding up and preparation of estimates for proposed projects, reduction to a minimum of obsolete material and also a reduction of labor in connection with purchasing, receiving, inspecting, storing, disbursing and general accounting. To this end four methods of inspection and testing of materials, depending upon their nature, were recommended—(1) at source of supply, (2) during process of manufacture, (3) at receiving point on purchaser's premises, (4) by outside experts or laboratories. The value of a current materials and supply catalog to be circulated periodically among the various departments of a company was strongly urged. Several companies have produced catalogs which are brought up to date periodically and have found them to be of help in keeping department heads apprised of what equipment is available in stock.

Security Holders' Records

To meet the requirements of both large and small companies the report of the committee on security holders' records, Francis J. Brett chairman, was made in two parts, one, accounting methods for the sale of securities by use of mechanical devices, and, two, accounting methods for the sale of securities by smaller companies which do not use mechanical equipment. Because of the increasing amount of stock that is being sold to customers and its influence upon public relations the value of accuracy in maintaining records of payments for stocks was emphasized. The report included a detailed description of all the form and procedure used by the Niagara Falls Power Company and pointed out the following desirable features: (1) Convenience and little chance of misunderstanding between the subscriber and the company; (2) accounts are always up to date; (3) no delay between receipt of contract or payments and recording such information; (4) entries made in such accounts are proved and balanced daily; (5) executives of company are kept in touch daily with progress of the sale; (6) the sales organization can determine most effective advertising; (7) the accounting organization can furnish promptly any information with respect to accounts; (8) accounting expense is minimized by use of mechanical devices; (9) records are neat and legible.

Short addresses of greeting from President Johnson, Past-president F. W. Smith, P. T. Davies, president of the Canadian Electrical Association; F. R. Jenkins, W. Paxton Little, Walter Lang and A. J. Patterson were also features.

Accountants' Responsibilities Keynote

Contact with Public Interests Affords Opportunity for Larger Usefulness—Relations with Engineers and Merchandising Departments Growing Closer

THAT the modern public utility accountant is doing valiant service in the world outside his office walls and can be relied upon to achieve still greater usefulness every succeeding year inside his organization as an aid in executive administration and in the departmental conduct of affairs was repeatedly emphasized at the second session of the Accounting Section on Wednesday afternoon under Chairman Jones. Addresses on the public relations of the accountant, his *rapprochement* with the engineering and merchandising departments, and the appeal of the association in conjunction with the American Gas Association against a proposed straight-line life method of depreciation accounting urged by the account bureau of the Interstate Commerce Commission were the main features of the program.

Accountants Perform Public Service

How the accounting practice of the city of Baltimore is being modernized in accord with the best corporation technique was outlined in an address by Herbert A. Wagner on "The Accountant and Public Relations," this work being done as a public service by members of the Baltimore company and other co-operating citizens who are putting increased efficiency into the municipal administration by co-ordinating their knowledge and abilities. Referring to experiences in his own company, Mr. Wagner said that accounting department costs have been cut 50 per cent in the last ten years, but that many opportunities for improvement remain. An accounting service department which passes upon equipment and methods and keeps informed of new devices, savings and practices in other utilities and industrial organizations has effected savings within the last few years at Baltimore which have far exceeded the cost of the work. The speaker quoted extensively from an article published in the ELECTRICAL WORLD for July 29, 1922, upon "The Use and Purpose of Accounting" and urged the preparation of time-saving reports for executives by accounting departments, wide publicity of costs within one's organization and cost conferences for foremen and higher officials.

Comparisons of accounting costs between companies have been made for some years by the Baltimore company, and in a recent year the average cost for seven companies having more than one hundred thousand customers each was $2.24 per meter per year. The range was $1.19 to $3.52. This cost included meter reading, billing, bookkeeping, credits, collections and customer statistics. Mr. Wagner deplored the lack of a cost-accounting system in the N. E. L. A. which can be used as a basis for rate making and recommended the study and development of such a system by the association. Chairman Jones expressed the willingness of the Accounting Section to undertake this work, provided the request comes from the executives or the Rate Research Bureau.

Engineers and Accountants Co-operate

H. P. Liversidge, chairman National Technical Section, then addressed the gathering upon "Accounting from the Engineer's Viewpoint." The old hostility is rapidly disappearing in the recognition of mutual needs, he said, and engineers and accountants realize as never before their mutual dependence. The maintenance of continuous operation is no longer the nerve-racking problem of twenty years ago, and the present question is largely how to operate at minimum cost. Much depends upon how accounting data are specified and presented. Sources of leaks in cost compilations are generally found pretty far down the line in the subdivision of accounts. Engineers too often insist upon detailed cost data of doubtful value in many cases, but by co-operation, sympathy and open-minded understanding of mutual problems information of real value can be secured at minimum cost.

JOHN F. GILCHRIST
Vice President
Commonwealth Edison Company

Examples of Helpful Accounting

Mr. Liversidge cited several cases in power-plant operation where excessive costs of maintenance were run to earth through accounting co-operation. In one case the maintenance of group-driven stokers totaled $30,000 a year, and the combined study of engineers and accountants resulted in a saving of $9,000 annually by changing to individual drive with added boiler efficiency attained through more flexible control. In another plant the accounting analysis showed the cost of cable haulage in the coal-handling system to be $5,000 a year and indicated that by making special wheel designs the cost of operation could be cut to $2,000 a year, which was done. In another plant a saving of $75,000 a year was realized in ash-hopper repairs as a result of subdividing maintenance costs in the boiler house and locating this source of excessive expense.

Direct issue was taken in an address made by Carl D. Jackson, New York, counsel of the N. E. L. A., with recommended depreciation accounting methods lately discussed before the Interstate Commerce Commission by leading railroad interests and representatives of the N. E. L. A. and American Gas Association. The Bureau of Accounts of the commission recommended that depreciation be determined on a life basis for each unit of property, while the utilities have in substance asked the commission to accept the retirement reserve system for any of their property for which the board may finally decide that a reserve is proper or necessary. The position of the carriers, emphasized by the testimony of executives of wide experience, is that the words "depreciation expense" should be confined to that operating expense necessary to meet retirement losses not cared for in charges to ordinary maintenance accounts. The association's petition is that the reserve thus provided for is to be sufficient to cover these retirement losses when and as they shall occur.

The utilities maintain, the speaker said, that the bureau's theory of accounting would result in an unreasonable and excessive reserve, serving no useful purpose, and one based upon a formula incapable of ascertainment or forecast, and if adopted for electric and gas service would unreasonably burden it.

Gilchrist Urges Larger Profits in Merchandising

John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, made a vigorous plea for more satisfactory profits in appliance merchandising. The handicap of low-price distribution of appliances to place them on central-station systems in earlier years continues to be a wet blanket upon the legitimate prosperity of electrical appliance dealers, both inside and outside the central station. As a result of this mistaken policy it is extremely difficult to conduct an all-electric appliance store successfully, without other sources of revenue, anywhere in the country. Yet the market for appliances is far from exploited, declared the speaker, who estimated that a properly equipped electrical home should have at least $500 worth of appliances in use under its roof, and that utilities should sell from $30 to $50 worth of appliances to residence customers per year instead of $10 worth or less. If the appliance service bill for electricity were what it should be, the central station would receive at least $2 per month more per customer than at present. This could be achieved with little or no increase in plant investment and practically no increase in billing cost. There is little weight to the contention that many families cannot afford to use electrical appliances, in view of the fact that many people with incomes of less than $2,000 a year spend from $300 to $500 a year to operate an automobile of even the cheapest type.

In its present stage electrical merchandising is abnormally expensive. The public is not yet sufficiently familiar with electrical commodities. The speaker asserted that accountants should allocate charges to merchandising departments in utilities so as to make the worst showing possible upon the costs of conducting this business. This practice will help to reveal the real economics of the situation, enabling the dealers to lay the facts before the manufacturers and to put prices and costs on a basis that will bring independent dealers a profit. It is desirable that manufacturers establish a retail price high enough to give the dealer a reasonable profit or else give up the practice of publishing retail prices.

H. M. Edwards, New York Edison Company, the final speaker of the session, outlined the problems of the modern accountant, pointing out the facilities at his disposal and indicating that a seat in the inner councils of the industry awaits the progressive and competent member of this profession.

Accountants Discuss Educational Problems

Attraction of Work for Young Men Increasing as Opportunities Broaden—Budget Control, Cost Accounting and Regulation Issues Complete Excellent Program

FURTHER evidence of the Accounting Section's growing interest in larger utility problems was presented at the third and closing session Thursday afternoon, when Louis F. Musil addressed the meeting upon "Budget Control," discussing its broader aspects; Stuart C. McLeod gave an address on "Cost Accounting," emphasizing the industry's need for an adequate system; Dr. John T. Madden spoke on the "Education of Accountants for the Public Utility Field," and George C. Mathews, chief statistician of the Wisconsin Railroad Commission, made a vigorous plea for sound depreciation accounting in an address entitled "Accounting in Relation to State Regulation." The last speaker corroborated Carl D. Jackson's stand on behalf of the N. E. L. A.'s position against the life method of computing depreciation reserves as set forth in Mr. Jackson's previous résumé of recent testimony and arguments before the Interstate Commerce Commission.

Budgeting Not Merely an Accounting Process

"It is as important for the foreman of a gang to understand the meaning of budgeting as it is for the general superintendent of an operating company to comprehend its significance," declared Louis F. Musil in an address upon the value and necessity of budget control in its broadest interpretation. Lack of an understanding of costs is a fertile source of indifference of labor. "I hope the word budgeting will stop being construed as an accounting process only, or as a mere schedule of estimated cash receipts and disbursements, or as a mere procedure through which a group of men or departments can get appropriations and be checked up as to whether they stay within the approved limits," said the speaker. He contended that the principles of budget control should be "sold" to the industry ahead of mere matters of procedure.

Interchange of Costs Should Be Permitted

Stuart C. McLeod, secretary National Association of Cost Accountants, New York, outlined the tendencies toward simplification, standardization of costs and uniformity of cost methods which have been making headway in American industry of late. He pointed out that cost accountants should deliver information in a form useful for quick reference and easy comprehension by their executives. The speaker called attention to the need of a properly designed cost accounting system for the electrical industry, saying that 160 uniform systems are now available for different industries in this country. A suitable system should be devised by committees of men working in the industry reinforced by expert guidance. A great advantage of an association system is that small companies can afford to install it, and where it is intelligently used much ignorant competition is eliminated.

In the opinion of Mr. McLeod, the Sherman law by blocking the comparison of statistics by trade associations is a great impediment to business. This form of government interference is of political origin. Prices are controlled in the last analysis by the law of supply and demand, and the popular idea that prices can remain fixed after comparison of industry statistics has been made is fallacious.

Educating the Accountant for Public Utility Service

Dr. John T. Madden, acting dean of the School of Commerce, New York University, advised members with accounting training to accept invitations to give lecture courses at universities, pointing out that these will be helpful in attracting recruits of a high type into the industry. The need of developing qualified personnel to take up the future accounting responsibilities of this industry is increasing, for the time is coming when those now in the saddle who were trained through experience in the early days of central-station development will find lighter burdens desirable.

Dr. Madden advised the N. E. L. A. Accounting Section to get in touch with local organizations of public and industrial accountants, for by this means vital truths about public utilities will be passed on to the clients of these specialists.

Dr. Madden recommended that a copy of the proceedings of the Accounting Section be placed in the library of every collegiate business school in the country, and in closing urged the accountants, as key men in the industry, to develop and expand their own understanding of finance, law and economics, in order to fit themselves for advancement to posts of greater responsibility.

Accounting in Relation to State Regulation

Mr. Mathews then delivered a scholarly address criticising the use of the life table basis for establishing depreciation reserves. This, he said, gives the appearance of scientific handling where the substance is lacking, the statement being especially true with regard to the very classes of property for which reserves are most needed. Lives of small units of property such as ties, rails, meters or poles may be estimated with some degree of accuracy, but when one comes to the very property against which reserves are needed the life estimates are mere guesses. Under these conditions, to make provision for retirement losses on the basis of assumed lives, may not only be useless but may seriously misrepresent the facts.

If excessive reserves are to be built up, they must be created by charging more for the service than would otherwise be necessary. Their appearance on financial statements will in many cases be taken as a reflection upon a condition of the property, often unwarranted by the facts. For this reason the National Association of Railway and Utilities Commissioners, through its committee on telephone depreciation, has definitely gone on record before the Interstate Commerce Commission as opposing adherence to a life-table basis and is recommending the adoption of the retirement theory.

Life insurance statistics are subject to no such uncertainty. The insured is either alive or dead, but where repair and rehabilitation of hundreds of items of property are involved, there has been no uniformity of opinion as to when the original piece of property should be written off or as to how long ordinary repairs are considered to have kept the original item in service. No classification of accounts has even been able to say just where maintenance ends and retirement begins.

The result of this has been that in the reports of any two companies following the same classification maintenance expenses may represent quite different things. Even if the life of a property generally could be accurately determined, a public service commission proceeding strictly on a life-table basis would be compelled directly or indirectly to redetermine that life for each company in view of the maintenance standards followed by the utility in question.

Bearing in mind that the number of utility companies controlled by a single commission sometimes totals between one and two thousand, the impossibility in actual practice of determining the effect of current maintenance upon lives of property is manifest. Not all the commissions are disposed to abandon this basis at the present time, but there seems to be a distinct tendency away from the life-table basis and toward the adoption, in some degree at least, of the retirement principle.

Triumphs of 1923-1924*

Remarkable Progress in Every Phase of Utility Activities — Development in Finance, Customer Ownership, Interconnection, Rural Service and Technical Practice—Outline of Fundamental Problems to Be Met—Taxation Situation and Waterpower Development—Achievements and Policies of the Association

By Walter H. Johnson

Retiring President National Electric Light Association

WALTER H. JOHNSON

WHATEVER might be said of the others, the electric light and power industry continues to forge ahead. High records have been established during the year. The largest waterwheels ever built have been placed in operation at Niagara Falls, carrying 83,000 hp. on a single shaft; the mightiest steam turbine, 62,500 kva. in a single cylinder, at Brooklyn, and an engineering feat of the first magnitude was achieved when 220,000-volt transmission became effective on the Pacific Coast.

A total of more than fifty billion kilowatt-hours of electricity has been generated during the year, although the amount handled by electric light and power companies through sale and resale approached seventy billion kilowatt-hours, and 1,350,000 new customers have been added to our circuits. Income now exceeds one billion dollars yearly, and almost as much new money was raised last year for new construction and refunding. It is no mean achievement to continue to double the production of electrical energy every five years. It requires far-seeing management as well as engineering skill of an exceptionally high order to design and to build generating stations and distribution networks which are so efficient in operation that the cost of the service remains the same as it was before the war, if it is not actually less, even though the cost of equipment, labor, fuel and fuel transportation considerably exceeds pre-war prices.

The magnitude of the electric public utility problem, upon a proper solution of which the continued prosperity of the country largely depends, is not thoroughly appreciated. During the past five years the public utilities of the country have raised through new corporate issues more than three and three-quarter billion dollars. The steam railroads of the country during the same period raised approximately two and one-half billion dollars, which was less by three hundred million dollars than the total amount raised by the electric light and power companies.

Upon the basis of detailed studies made by a majority of Class 1 railroads, one of the committees of the United States Chamber of Commerce—that on the governmental relations to railroad transportation—estimates that to provide facilities and equipment for a 25 per cent increase in passenger traffic and 33⅓ per cent increase in freight traffic on the railroads alone within the next ten years will require an expenditure of $7,870,000,000. This is a staggering sum of money, yet the estimated sum which must be raised by electric public utilities alone to provide for additional facilities needed to enable them to handle the probable increase in business and to complete some of the hydro-electric developments filed with the Federal Power Commission will reach approximately ten billion dollars in the next decade. This shows briefly what a gigantic financial task faces the industry.

Judging by experience in the past and the avidity with which the securities of electric light and power companies are now bought on the open market, we have every reason to believe that our march of progress will be continued and that this huge sum of money will be forthcoming. It will be if the traditional American economic policy is pursued and regulation continues to follow the principle both of protecting the public and of awarding rates which will yield a proper return on the capital invested in the business. Private ownership and operation of public utilities in the United States is in accord with American practice and tradition. And whenever the issue has been brought up in the individual states in recent years the electorate has decided that the electric public utility shall continue to be privately owned and operated under a fair system of regulation.

It will, of course, be appreciated that electrical development cannot be adequate unless the credit of electric

*Abstract of presidential address at the forty-seventh convention of the National Electric Light Association, Atlantic City, N. J., May 19-23, 1924.

public utilities is upon a sound and stable basis. Our present system of regulation through state public service commissions, while it affords no guarantee, is generally conducive to stability of credit. It is in the public interest, and in fact a corollary to private ownership and operation, that commission regulation shall not injuriously restrict the initiative of electric public utilities or interfere unduly with effective management.

By and large, the commissions of the country have followed sound economic lines in the regulation of the utilities and, while consistently upholding the rights of the public to adequate service at reasonable rates, have not disregarded the rights of utilities to fair treatment and adequate facilities for expansion and growth.

WHY THE INDUSTRY PROGRESSES

There is no yardstick that we can use in comparing our industry with any other. Nor do general business conditions reflect accurately the status of the electric light and power industry. For example, the statistics of the steel trade are everywhere accepted as a reliable barometer of general trade and business. Variations in trade currents find accurate reflection also in the figures of bank clearances. Neither of these, however, serves as a reliable index of conditions with us. The year 1921, for instance, was a period of intense business depression—the industrial prostration having been very pronounced—and the bank clearances of that year and the report of the largest industrial corporation in the world, the United States Steel Corporation, reflected the depression.

The electric light and power industry, on the other hand, has an entirely different story to tell. Its march of progress has been continually onward and upward. Not only has the output of our stations increased tremendously since 1920, but every year has also shown an appreciable gain in income, commensurate with the increased output. The increased income from sales of energy last year was 37.6 per cent over the income received in 1920.

Moreover, during the period enumerated there have been considerable rate decreases, when the financial condition of the company so warranted. Thus we have to our credit greater output, greater income, greater efficiency and lower rates, giving unmistakable evidence of initiative and enterprise and establishing a record unapproached by any other large industry in recent years.

In striking contrast with the efficiency of the electric light and power companies is the inefficiency of government operation. The contributions to the government made in the form of taxes by electric light and power companies as well as other corporations continue to increase. We stagger under taxes which seem never to grow lighter, and in the case of public utilities this fact affects the interests of the user of the service by adding to the amount collected from him in rates.

The whole tax situation, federal, state and municipal, is badly in need of reform. According to the National Industrial Conference Board, in 1913-14 about 6½ cents was taken out of each dollar of national income for taxes, but in 1921-22 14.3 cents went out of each dollar of income for taxes. Economy can never be induced until limits are set by the people to the spending power of government. There is little incentive in business when the tax collector receives more from it than the stockholder who has placed his money in it. Such a situation retards enterprise while it discourages risk.

During the year no specific national legislation has been enacted which has been harmful to the electric light and power industry. A renewed attempt has been made to set at naught the avowed policy of the government with reference to national water powers as enacted in the federal water-power act of 1920. So far these attempts have been futile.

The Muscle Shoals controversy and the propaganda emanating from it have, however, had this very desirable effect: They have brought home to the people of the country the knowledge that the government has a very definite and fixed policy on water-power development. That policy, expressed in the water-power act of 1920, is now generally accepted as reasonable and sound, and to it every bidder for Muscle Shoals must submit.

It is unfortunate but nevertheless a fact that power is required most where water is least available. Steam stations will have to be relied on, therefore, for most of the power required in the New England, Middle Atlantic and North Central States, regardless of the possibilities contained in the St. Lawrence and Niagara Rivers. This should not cause the country much concern because the electrical industry uses coal very efficiently. Even today, with our immense output of energy, we consume only approximately 7 per cent of the coal mined in the United States, and advances in the art tend to bring greater and greater production of electricity per ton of coal burned. We now produce twice as many kilowatt-hours per ton of coal burned as we did ten years ago.

Although the electric light and power industry disposes of the larger part of its output in industrial centers, we have not overlooked the farmer, because the general prosperity of the country depends in great measure upon agriculture. There is no gainsaying the fact that the lot of the farmer in the last few years has been hard. To be sure, he has not shown much flexibility in adapting himself to changed conditions. He has shown little ingenuity in working out his own salvation and has been inclined to rely upon the government and special legislation for relief. However, agriculture cannot be allowed to remain impotent. Discontent among the agricultural classes is in the interest neither of the farmers nor of the country as a whole.

The electrical industry cannot plant the farmers' crops or transport and sell them at harvest time. We believe, however, that electricity can be of great assistance to the farmer in lightening his burdens and making his living conditions more tolerable. In that belief, and without any desire to attack the problem haphazard, your association is at present engaged in a scientific study to determine whether electricity can produce the economies and efficiencies in farming operations that it has accomplished in manufacturing.

The electric light and power companies were the first to adopt as a fundamental policy the sale of their stock direct to their employees, their customers and to the local public. As a result the number of stockholders in our various public utility companies has been increased immensely. By this means we have been enabled to raise large sums of money, approximating last year $300,000,000, with which to carry out our many construction programs. The customer-ownership idea has given electric public utilities greater moral and financial strength.

Superpower and Interconnection*

Economical Expansion Possible in These Twin Developments and Necessity of Keeping Initiative Free from the Deadening Influence Both of Bureaucracy and of Socialistic Experiment

By Herbert Hoover
Secretary of Commerce

ELECTRICITY is the greatest tool that has ever come into the hands of man. I propose to say something on the future of its development from a national point of view as I see it. More particularly do I wish to speak of our public relationships to it. The subject is of the highest importance, and it is most needful that our people as a whole should understand more of it. I do not propose to envisage a dream of one hundred years hence, but to set forth the immediate program necessary to assure continued development. Wisdom consists more in a perception of what to do next than it does in a knowledge of the ultimate.

HERBERT HOOVER

We have outdistanced all the world in our electrical development up to now. Today we have twenty-seven thousand telegraph stations, more than fifteen million telephones, over six hundred radio broadcasting stations, over three million receiving sets with possibly fifteen million listeners. Nine million homes are wired for lights, and we have the capacity to generate over twenty-seven million electrical horsepower. The American wage earner has at his elbow 50 per cent more power than any of his competitors. In consequence, his product is greater, his wage higher and his physical strain is less than any other.

The nation which possesses the most adequate, the most reliable and most mobile power and transportation systems will lead all others in economic progress. Because we are in possession of those two mighty and controlling tools we are in that position today. Yet we are only on the way to greater things, for electrical science has now provided us with the means to still greater accomplishment.

We yet have a quarter of our homes without telephones, half of them without electric lights, two-thirds of them without radio. We will need thirty million more electrical horsepower in twenty years. Within that time our electrical industries must find thirty or forty billions of dollars in capital with which to add the necessary equipment to our national plant.

The real purpose of all this development is, however, not to make self-satisfying statistics nor to make new stocks and bonds. Its real purpose is this, that through more power we shall make a still greater saving in labor, increase the product of labor and lessen the burden upon labor. Through even enlarged communication we shall increase our effectiveness in the direction of industry and commerce; we shall further the spread of intellectual ideas. Thus we gain in higher standards of living wider enjoyment and comfort to every fireside, which is the end and sole purpose of our economic effort as a nation.

All this has been the vision of that life of superlative usefulness —Mr. Edison's. And the men who are today directing this great industry are more than ever before realizing its community purpose. There was a time when the application of electricity was viewed as merely a useful basis for promoters for stocks and bonds. That time has gone by. Today we have in the men of this industry, in its great majority, a vast vision of more purposeful accomplishment.

But my main purpose is to speak of the development of power. The next great step here also is interconnection. For interconnection is now the road of our great electrical march to more economical expansion. Indeed, we have here before us a step of progress which will ramify into every field of our economic life.

This new vista in progress has been opened to us by the perfection in transmission of electric power up to 200 or even 300 miles and the higher mechanical efficiency of our generators up to 70,000 hp. in a single machine. With these twin developments comes the opportunity to generate power in much larger and more economically located stations, to harness our water powers which were too remote for use even ten years ago and to bring them into the field of population. Herein are elements of often miscalled superpower.

We have in the United States today about six thousand separate power and lighting systems. To take advantage of these new forces we need interconnection of these isolated systems over large geographical areas so as to provide a sort of great reservoir into which these larger streams of power may be poured from central plants and from our greater water powers. Some interconnection has taken place, but in this large vision of our more recent engineering advances less than 10 per cent of the systems are interconnected. We have many gains to make through this wider interconnection and central generation. From them we shall secure cheaper production costs, greater reliability, better utilization and consequent conservation of our coal supplies and larger utilization of our available water power.

*Abstract of address made by telephone to forty-seventh convention of National Electric Light Association at Atlantic City, N. J., May 19-23, 1924.

Our thousands of minor isolated generating plants are each compelled to maintain reserve capacity in order to insure supply and reliability. Their very interconnection into large groups enables them to abandon safely a large proportion of their individual reserves and rely upon a central reserve. By their interconnection we secure at once a larger diversification of use and a greater evenness of load by which the same size of generating equipment will take care of a much larger number of consumers. Taking the nation as a whole, we do not today work our isolated plants to more than an average of 20 per cent of their capacity, yet with interconnection we can expect at least a 50 per cent load factor.

Better Utilization of Water Powers

Beyond this again lies the better utilization of our water powers. By and large, 75 to 80 per cent of our power east of the Rocky Mountains must be generated by steam even under the maximum development of our streams and rivers. The power that is available from our streams varies from winter to summer. The secondary power from this flood flow is of little value by itself, for light, heat and power must be continuous; but by pouring it into a general reservoir of consumption this seasonal supply can be used and the steam plants stand by for the low-water season. Thus we can secure the full development and use of the secondary power of our streams, and the use of it nearly doubles the amount of our available water power.

Such a power system renders the electrification of many railways possible, offers advantages to the large manufacturer and should ultimately displace thousands of our small steam plants and place reserves of power available for increasing demand.

We have made some progress in this direction, particularly in the Southeast and the extreme West, where power development has been mainly from water sources. Within a very short time the power lines from San Diego to Seattle will have been connected throughout. In the South we now have the most advanced superpower development in the nation, extending as it does from Alabama across to North Carolina. Yet, as I have said, we are only at the beginning. In the Northeastern States, where little has been done, the annual savings are estimated at half a billion dollars against a construction cost of a billion and a half, with an annual conservation of 50,000,000 tons of coal by 1930.

The indirect results, both human and material, are even more important than these statements I have made would imply. For I have taken no account of the vast losses to industry and commerce by the actual interruption and threatened interruption of fuel supplies to our several hundred thousand independent steam units; no account of the relief to shippers from our already overburdened transportation and terminal facilities; no account of the increased production of our factories from cheaper power; no account of the larger extension of power into farm and home, of the reduction of physical labor and the increase of comfort. Nor have I taken account of the great savings in our coal consumption, the lessening burden upon transportation.

To secure the rapid adoption of these demonstratedly possible results is of profound public importance.

Now, all this gigantic development raises hosts of problems in governmental relations. If we would secure these great benefits, we need a wise statesmanship. From the very nature of the industry it is one where there must be a large measure of public control. Yet to draw the fundamental principles upon which these relationships should be based is no easy task. They reach deep into our whole social conceptions.

When we come to the practical problems of government in relation to this problem the test lies in two directions. Does this act safeguard the equality of opportunity of our citizens? Does it maintain the initiative of our people? For in our answer to the first of these questions must lie the dead line against discrimination and exploitation, and thus the protection of public interest, and in the answer to the second the dead line against socialism.

The economical distribution of power requires local territorial monopoly. Competing systems in power distribution in the same area mean an enormous duplication of capital and represent a tremendous waste in equipment and operation, and in the end such duplication is a charge upon the consumer. But when we accept the principle of monopoly we at once must accept the principle of public regulation. There may be a few who still contend for the right to do anything they please, but they are fast recognizing the inevitable, and there is no need for dispute. The principle of regulation has been recognized by our state authorities over the entire nation.

Our governmental relations until recent years could be compassed by the sole authority of the separate states. But today through longer transmission and interconnection the state boundaries in power distribution are disappearing. Moreover, the control of much of our water resources lies in the federal government, and its distribution must move across state lines. These new developments thrust upon us new considerations of public relationship.

Power Must Flow Freely

Unless we have a liquid flow of power into its natural channels of consumption we shall have permanently a larger cost, less reliability of service and imperfect utilization of our coal and water resources. We cannot secure superpower development unless there is free flow of power across state lines. We have thus at once created at least a physical and economic interstate question. Our power development must now take a national and not a local basis.

There are time-honored disputes over state rights with regard to water. Somewhat similar questions are being raised in many states with regard to water power. I am advised that no embargo could be constitutionally placed upon the free flow of power across state boundaries. Yet it is being attempted by some states. Moreover, discordant methods of regulation in different states may amount to economic barriers upon free flow and thus stifle development. I am quite alive to the practical situation among our people who live near water-power sources and who believe they should have the first use of their cheaper water power. I believe that by constructive co-operation this right can be satisfied and yet interconnection can be fully established.

Federal regulation is not the road to solution of these problems of interstate movement of power. I would regard any federal regulation such as has been found necessary in transportation as a disaster to the development of our power resources. The fact is slowly emerging that the United States will eventually divide

itself into several power districts each with its own problems—problems relating to the origin of power, problems of climate, problems relating to the character of industries and uses. No national regulation can supply that intimate knowledge of local problems which this industry requires. I believe that power development and distribution would find its greatest solution in co-ordinated state regulation among groups of states, perhaps with voluntary assistance from the federal government in securing this co-ordination. We need interconnection between state utility commissions where conflicting questions arise.

The formation of a committee under my chairmanship from representatives of the states from Maine to Maryland is a step in the direction of co-ordinated action in this the most important of our power areas.

Another of our public relationships to power lies in the federal control of some part of our great water powers. Under the Federal Power Commission we have undertaken to secure the development of these great sources of power through private initiative under terms providing for the protection of the public and recovering to the government the right at the end of fifty years to resume ownership.

This brings me to another phase of public relationship which has received some discussion. We have some persons who insist that the federal government should now undertake wide superpower development. Not being a socialist, I am not for it. Much of this discussion comes from lack of understanding of the practical aspect of the industry. We find many people enthralled with the notions of "superpower" or "giant power" who conceive it a superimposed financial and industrial structure over all existing systems. At once they envisage a gigantic and grinding trust in the background. As a matter of fact no superstructure of this sort is possible. Superpower means interconnection of systems and larger central stations, coal or water, scattered over the whole Union. It is in daily progress before our very eyes.

Interconnection does not imply capital consolidation or the building up of great trusts. It implies the sale and resale of power from one utility distribution system to another, and it implies co-operative action between utilities in the erection of central stations. It must embrace municipal plants as well as corporation plants. It implies no gigantic exploitation, for that is impossible under state regulation of rates and profits.

Effect of Bureaucracy on Initiative

But there are objections of more fundamental importance than this. As one who believes that the progress of our nation can come only by preserving on one hand the vital initiative and enterprise of our people and on the other an equality of opportunity to all. I necessarily do not favor the strangulation of both by the hand of bureaucracy and politics. No bureaucracy with a board of directors of 580 Congressmen and Senators would have made the electrical discoveries of the last fifty years or pioneered their application. Our political system has not yet developed and will not for generations to come to a point where it will have either the capacity to choose skill or the assured probity to operate these implements. Our institutions will break down if we impose such burdens upon them.

We have seen nothing in our history to warrant us in the risk of stopping all progress by the deadening hand of the government. I know of no greater disaster that could come to the workers in this industry than to place their fate in the hands of political jobbery or stifle their individual opportunities through the leveling of bureaucracy which all this would bring about. At the same time the regulation of natural monopolies by the government is a vital part of the preservation of this fundamental equality of opportunity to our citizens, for if the use of this great weapon of power were to fall unrestrained into the hands of dominant groups, then equality of opportunity would also disappear. If we have not the capacity to regulate these great tools in public interest, we much less possess the capacity to operate them on behalf of the federal government.

Relation of the Industry to Regulation

Finally, I should like to say something upon the relations of the industry itself to the problems of government regulation. It is true that there is always agitation for further governmental interference because of either real or fancied abuse. New abuses and new relationships are the inevitable growths of continued progress. New inventions involve new issues and new relationships. It is my belief that these abuses can be cured as they arise by the constructive action of the industry itself if it so wills. Many of these new problems cannot or will not be solved by the individual alone. They can be reached only through association in the industry as a whole.

In a recent address at Cleveland I endeavored to set out the thought that it is through the growing strength of these associational activities of our industries, our professions and our occupations that we have the greatest hope for the development of those high standards of conduct in relationships to the public which in application will minimize the necessity for government intervention to correct abuse. I stated that I believed that in the transformation of the whole super-organization of our economic life we are passing from a period of extreme individualistic action into a period of associational activities. In these associational activities lie forces pregnant with infinite possibilities of moral progress, possibilities of large public vision and establishment of public confidence. American business is never secure unless it has public confidence behind it; otherwise it will be a prey of demagoguery and filled with discouragement.

You embrace within your association directly or indirectly all of the elements of this great industry. Your association has shown great constructive abilities in the development of business ideals.

There is a noteworthy development in which your industry has led all others—and to a most remarkable extent. That is the placing of your new capital issues with your consumers and your employees. Nearly two million people now own the industry. Herein lies a new solution of our problems—one of the greatest promise. It is an entry into vital co-operation that almost makes one feel the touch of a new industrial world.

American business needs a lifting purpose greater than the struggle of materialism. It does not lie in some visionary and emotional crusade. It lies in the higher pitch of economic life and finer regard for the rights of others, through the organization of the great tools in our economic life so that they may produce happier individual lives, more secure in employment, wider in possibilities of comfort and enjoyment, larger in possibilities of intellectual life.

Good Service Proves the Best Advertising*

Just a Little More than Contract Obligations Brings Returns Far Beyond the Cost—How Keeping Appliances in Repair Pays

BY SARAH M. SHERIDAN
Vice-President Detroit Edison Company

GOOD service is the best advertising an electric light company can do. To furnish it we must go beyond our contract obligation, so far as to see to it that a customer's apparatus does really function properly, and no company can give such service unless from top to bottom throughout its organization there is held a certain belief.

I am not spreading a gospel. Above all, I am not a critic. But since the quite early years of the beginning of this industry I have been on its commercial side, and I have been in constant contact with individual customers—customers of all types and kinds, from the customer that objects to a 45-cent minimum bill to those whose use of central-station service for factory operations runs up to 20,000 kw. And in spite of all these things, years and contacts and wear and tear—or it may be because of them—I have a friendly feeling for customers.

It may be that there will come a time when the use of electricity will be to everybody so much a matter of course that an electric light company need do no more than deliver its energy to a customer's premises. But we are still in the era where electricity is a mystery to the man in the street, and the ordinary customer expects to be helped—in fact, needs help—in the use and adaptation of it to his needs. The electric light company is the medium through which this help should reach him. We all want our service to be used to the limit. Whether we want to serve all of our public or not, it is our business to do so, and we cannot apply an educational test. The only limit to the use of electricity is economic.

To more and more people the use of electricity is leaving the realm of mystery and wonder and becoming a practical every-day affair that does not require special knowledge, but even so, the customer who can be trusted to replace a fuse is still in the minority. Yet causes which have been evident, and have been cleared by the fuse blowing, are the most common causes of interruption of service. If a customer has to call in an electrician to put in his fuse and pay for the call, he is likely to be without service for some time and also to count the electrician's fee as a most objectionable extra in the cost of service.

SERVICING HOUSEHOLD APPLIANCES

As for the household appliances, here we cannot hope that more than a very few will have mechanical ingenuity to keep electrical appliances in repair. I have known an electrical engineer who could not fix the household flatiron when it was out of commission. What can we expect of a lawyer or a grocery clerk? Yet we want every one of our residence customers to use as many appliances as possible and use them regularly to improve our load factor and to increase our revenues.

When a flatiron goes out of business in the midst of the Tuesday ironing a woman whose week's work schedule is disarranged thereby does not stop to consider whether the blame should be laid at the door of the electric light company, the manufacturer of the iron or her own possible misuse of the iron. But if the electric light company has a repairman at her house within the hour to put the iron in working condition or loan her another one, she is very sure to give full credit to the electric light company and tell her neighbors about it.

When a factory employing hundreds of men is without power because of failure of the central-station energy, the management of that factory is not concerned about the amount that will not be run up on his meter, but with the fact that his production is stopped and his profit checked for the time. Of course, if interruptions of this kind are frequent, a central station will not have many large manufacturers depending on it for their power, but when the rare, inevitable interruption does happen, if the central station can give promptly an intelligent report as to the nature and extent of the interruption, and if service is restored diligently, at no matter what cost, the customer will treat such an interruption as a happening that could not be avoided and on a par with accidents likely to happen if he had his own plant.

The sooner a company makes the initial connection for a customer the sooner the company's revenue from that customer starts. I fear that sometimes a company feels that it is doing a customer a special favor in hurrying up a connection. In most cases the revenue gained by early connection is, at least, an offset to the cost or inconvenience in the speeding up of the work. The company is likely to get the blame of delay even if it is a wiring contractor or a city inspector that is the real defaulter.

ADEQUATE SERVICE BRINGS RETURNS IN MONEY AND GOOD WILL

To perform a good and adequate service does not mean that part of your public shall have a good service and others be less well served. Most large customers are pretty well able to take care of themselves and frequently prefer to do so, and it is the customer of average and small use to whom most of this service must be given. The argument against so much individual service or so high a standard of service to the small customer is that the cost of serving the small customer is too great as it is. This is true, but repair service on a large scale, when properly organized, can be rendered at a less unit cost and a less total cost by the lighting company than by dozens or hundreds of private repairmen, and will it not be "the greatest good to the greatest number" if the company sees to it that the total cost of service to the consumer is as low as may be?

A company can keep in repair many thousands of flatiron cords for $25,000 a year. Customers having the advantage of this free service value it far beyond its cost to the company. Many companies have liberal advertising appropriations. A twenty-five-thousand-dollar addition to the advertising appropriation of any of these companies would have a relatively small effect, but if spent in keeping domestic appliances in order it is the best kind of direct advertising. Is it not the best kind of advertising to have your customers feel that they can depend on you for prompt service in emergencies that may arise?

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I have said that the limit to what may be done to help customers is economic. This is so in the nature of things, and it must not be forgotten in deciding whether this or that kind of extra service is to be furnished by the company. Good will is not measured in dollars and cents, but neither is the return from advertising, and you can go and guess how much the advertising would cost to persuade equally your public of your good will to it.

As to advertising, it is well that a public utility should advertise broadly what it has to offer to the public. Our industry may take honest pride in that what we offer to sell is of definite value and continuing benefit to the buyer. To reach those who do not know of it and those who know too little of our service we should advertise regularly and informatively. We should use all legitimate means of increasing our business so that the public as well as the company may profit by its increased volume. But in our advertising let us not proclaim as virtues and wonders the ordinary operations or the natural contingencies of our affairs. A constantly increasing part of the public realizes and appreciates what a tremendous factor electric service is to its community, but the public as a whole—or on the average, if you prefer it that way—is discerning and readily recognizes the difference between interesting publications of fact and flamboyant self-praise. Each of us has had the disappointing experience of realizing a sad difference between the bargain that was advertised and the bargain we bought. In our own business we can afford to give a better bargain and because our service is a continuing service it will pay us to do so.

We are engaged in an absorbing business. Almost every one of us likes his job and feels that there is something a little bit more to it than there is to the ordinary job, and each one of us has enough in his part of keeping the business going to absorb his energy and interest, but somewhere in every public utility, whether it is the sales department, commercial department or public relations department—the name does not matter—there should be a group, few or many according to the size of the company, whose first duty it is to think about the customers and to think the thoughts of the customers. Not customers *en masse*—not the group of big industrial customers that add so handsomely to the company's revenue, or the group of customers whose businesses are so large that they can employ for themselves specialists in every line, including electric service—but all the customers as human beings, like ourselves, who are buying something from us and paying for it and who as individuals are going to size us up according to what they get for the money we take. These customers know the value of the service to them, and when a large number of them recognize that they are getting good value, there grows up in the community that feeling for a public service corporation which is the most vital factor in its continuing existence—that is to say, favorable public sentiment.

"As a man thinketh in his heart, so is he." Therefore, the need of belief that is held by the chiefs and taught by them, and that reaches down without diminution throughout the organization—belief that the last little customer is entitled to good electric service because it is the creed of the company that he is to be well served without reference to his individual merits—belief that an "honest-to-goodness" public service company cannot let it be otherwise.

Employee-Employer Counsel in Industry*

Work Started by John D. Rockefeller, Jr., Bearing Fruit in All Lines Where His Plan Is Followed—Effective Way to Combat the Growth of Radicalism

BY CHARLES A. COFFIN

I THINK of you men of the N. E. L. A. not as mere officials, operators or business men, but as scientists, as engineers and as inventors. Surely those who transport without visibility or sound, those who make grass to grow where it never grew before and those who unlock the secrets of the universe deserve these names. It is truly said that the most interesting body of men which can be gathered together is of those whose work is search of truth.

Unlike other men, your achievements attract little attention until you make a demonstration and prove your case; then fame and renown are your portion, whereas the theorist, the essayist or the dogmatist in whatever field has often far greater repute before than after his demonstration. Your chief concern is the development and perfection of your profession and your art, which, relatively new, have in an astonishingly brief period done such great things throughout the world in transportation, illumination, industry, the household and in supplying the luxuries of life and helping the general betterment of social conditions.

You achieve results by co-operation, openness and fair play. Such competition as may exist between you is singularly free from asperities, and you work with the common purpose of promoting comforts and conveniences never before enjoyed. The accomplishment of one is for the benefit of all. Yet, wonderful as has been your work, it is not forgotten that there are many vital problems which concern the welfare of mankind and the stability of the state in which perhaps you have not all participated.

PERIL OF MISUNDERSTOOD LIBERTY

In a government as beneficent as ours there is always the peril of abuse of a misunderstood liberty. We witness an insistent impatience with restraint, a non-observance of and hostility to law and complete indifference to social order. In the consideration of noxious conditions of any sort we naturally seek the cause and search out the breeding places.

Perhaps the most lamentable condition has been a widespread hostility on the part of those who chiefly work with their hands toward those who chiefly work with their brains, a defiant attitude toward property rights, a condition of class hatred and misunderstanding on the part of the wage earner toward the employer—sometimes less the fault of the wage earner than that of the man by whom he is employed.

Radicalism is bred in the often harsh conditions of factory life, is carried to the fireside, and there grows and festers, all for the want of human understanding and the will to co-operate. From the wage earner who is treated, as often happens, not as a human being but as a vassal enmity and resentment only can be expected. It is true that many men are so consti-

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tuted as to fail to respond to a humane and sympathetic attitude on the part of the employer, and unhappily many employers fail to understand that the wage earner has the same characteristics, aspirations and virtues, the same love of family and children, that he himself has.

Some eight years ago steps for the betterment of industrial relations, which are merely human relations, were initiated under the direction of the sympathetic and constructive mind of John D. Rockefeller, Jr., at the plant of the Colorado Fuel & Iron Company, in which a very serious labor situation had long existed. The causes need not be given in detail. They were in part a local and wholly unjustifiable enmity to the Rockefeller name, the bogey of alien ownership and the uncommonly low morale of some of the labor leaders. Mr. Rockefeller's success, which was immediate and complete, was in a large measure due to the prompt establishment of sympathetic relations between himself and the better element among the labor leaders. Such is human nature that the atmosphere of misunderstanding and hostility was at once changed and the day saved.

Following Mr. Rockefeller's success in the Colorado Fuel & Iron Company, the Standard Oil Company established industrial co-operation in nearly all of its widely scattered plants. Under the impetus of its leadership large corporations in nearly every field have gradually established similar systems which are in successful operation in many hundreds of large manufacturing establishments in different parts of the country. The plan has always worked successfully where the management itself has wholeheartedly and diligently followed it up. Obstacles often arise which for a time create difficulties and result in delays—apathy on the part of foremen, opposition of local leaders and failure at first on the part both of the employer and employee to have faith in its success.

Plan Simple in Its Elements

The elements of the plan are simple and easily comprehended. The employees by secret ballot elect a committee from among their number, it being understood that none but wage earners in the employ of the company shall be eligible, booths for which purpose, of ordinary construction, are established in different departments of the factory. No pressure is exerted by the manufacturer in respect to employee nominations, and it is distinctly understood that there shall be no discrimination either on the part of the employees or the management in respect to race, creed, society, fraternity or union. Coincident with the election of employees' committees, the employers nominate a committee, generally equal in number, from among their representatives. All questions at issue, such as increased efficiency and production, working conditions, establishment of friendly relations, adjustment of disputes and redress of grievances, are carefully considered in a friendly spirit and are usually settled by unanimous vote. In the small number of cases which are not so settled provision is made for consideration by separate committees.

It can easily be seen that the establishment of such relations rapidly leads to understanding, fellowship and friendship as between employer and employee. Enmities for the most part disappear. The radicals of former days become conservative both among the employers and employees, and mutual faith, confidence and human sympathy are sure to become in this manner firmly established.

The General Electric Company inaugurated the plan at its Lynn works in 1918, and in several of its other shops similar plans have since been successfully established with results far beyond our hopes.

A prominent student of labor conditions in England who recently visited this country testified that if he had had no other object in view in coming to America, never having heard of the shop representative plan, he would have been well repaid by what he had learned regarding it. He became persuaded that it was superior to methods of dealing with labor disputes prevalent in England.

All honor to Mr. Rockefeller for his achievement in laying the foundation of the edifice of industrial peace which is steadily being erected thereon. His name will go down in history as the creator of a new era of understanding and good will. He has demonstrated the potency of the human qualities of sympathy and fair play and has proved the value of bringing people together by the consciousness that the simple virtues of life are the possession of the rich and poor alike.

A "Modern Instance"

There have been in our experience some picturesque instances demonstrating the value of getting employer and employees around the table without the clumsiness of an intermediary. I may especially mention one outstanding case, that of Mr. Ringer, who, while in no way surrendering his independence of thought or having any less sympathy with his shopmates, has become by his change of attitude and his thorough belief in the efficacy of the representative plan of very great value both to the company and to his fellow employees. He has become a prominent and active director in a finance corporation organized for the investment of the savings of the wage earners and is often called upon to deliver addresses giving the employees' view of the usefulness of the representative plan. So highly is he regarded outside our company that he was recently invited to deliver an address before the Massachusetts Institute of Technology, which followed an address delivered by our president, Mr. Swope, giving the employers' point of view. While these addresses were from different angles, both men were enthusiastic in their support of the plan.

Praise for Samuel Gompers

As the subject I have dealt with indirectly involves the question of organized labor, may I say a word before closing with regard to Samuel Gompers, who is often bitterly denounced by the employer class? While I am not in agreement with him in many things, I do not join in that abuse. I believe most of the labor union mistakes—and there are always mistakes in human organizations—are chiefly due to the men lower down, walking delegates, business agents, etc. Manufacturers themselves often suffer from the errors of foremen who in dealing with the wage earners have not infrequently been brutally unsympathetic. Mr. Gompers was a great patriot during the war and in peace he has persistently fought the spread of radicalism. Among his associates are many men of fine ideals. I hope and trust that the time may come when labor leaders and industrial leaders will reach a more cordial understanding and work more sympathetically and effectively than now for the common good.

Why American Railway Express Uses 1,800 Electric Trucks*

Definite Reasons of a Large User for the Adoption of Electric Transportation—Fifteen Specific Advantages of the Electric Truck as Compared with Gasoline and Other Types of Vehicles Are Enumerated

By Robert E. M. Cowie

President American Railway Express Company

ELECTRIC trucks are permitted without restriction about all manner of terminals and docks. They can be garaged and charged at the loading platform in or about the premises of any ordinary industry without increasing the fire rate on the establishment. Gasoline equipment maintained under similar conditions increases the fire rates on both the buildings and the stock contained therein. No figures are available that are suitable for general comparison, as all locations differ and each is rated individually by the local fire underwriters. As will be readily understood, the storage of feed and bedding for the horse greatly increases fire hazard.

In its own field, work of any kind which requires frequent starting and stopping, such as short city hauls and delivery routes, the electric truck is the most economical vehicle that can be obtained. The number of movements saved by the driver in a year on the average delivery routes because of greater ease in starting and stopping an electric truck as compared with a gasoline truck has been figured by one user as running well into the hundreds of thousands. The consequent saving in the driver's time and energy is an important item to any firm which has a large number of routes to be served and maintains a fleet of trucks.

Of even greater importance is the amount of wear itself that is saved. A gasoline truck is superior when used for long-distance hauling, for long delivery routes with few stops and for any kind of high mileage work. This is admittedly the field of the gas truck. For short-haul or frequent-stop work the gas truck is not economical or efficient. Wear and tear from frequent starting and stopping shortens its life. Gasoline consumption is increased by this kind of work, and tire wear and mechanical upkeep are greater.

Statistics compiled by the Postmaster General's Office show that where there is frequent starting and stopping gas consumption is three or four times as great as on long hauls with few stops. On the other hand, the electric truck starts smoothly and instantaneously with the positive action of the electric motor so that wear is reduced to a minimum.

Methods of Charging

There are four methods by which the problem of battery charging can be solved:

1. The batteries can be charged in the public garage at which the trucks are stored overnight.
2. Arrangements can be made whereby the local light and power company will charge the vehicle batteries at its own plant.
3. Charging equipment can be installed in operator's own garage or loading platform.
4. The batteries can be changed.

The principal disadvantage of the first method is that many garages are not equipped with the necessary installations for charging batteries. This is particularly true of the smaller towns and villages. However, the number of garage owners who find it to their advantage to prepare for this kind of work is rapidly increasing.

Method number two has the disadvantage of making it necessary for the vehicle to be laid up while having its battery charged at the power station. In one instance this disadvantage has been overcome by the power company which owns the batteries used in its customer's trucks. These batteries are placed in the truck, fully charged, at the beginning of the day's work, and the customer pays for this service on a mileage basis. In this way the truck operator pays only for what he actually gets.

Considering the subject from all angles, the third method offers the best solution of the problem. Practically every community in the country has a source of electricity from which the required energy can be drawn to meet reasonable demands. The only provision necessary is that the apparatus for feeding this electricity in its current form be installed in the operator's garage.

The fourth method supplements the third. The field of the electric truck may be said to be limited only by the fact that it must be able to put in where the battery may be recharged. The mileage obtained from one charging of the battery may be increased and the field of operation extended when facilities are provided for boosting or changing the battery.

Fifteen Specific Advantages

The advantages accruing from the use of electric trucks on short-haul or frequent-stop routes may be briefly recapitulated as follows:

1. The electric truck greatly reduces costs.
2. It is the fastest truck on short-haul or frequent-stop routes.
3. Its simplicity makes it easy to run and easy to repair.
4. It is rugged and reliable, seldom breaking down on the road and becoming disabled less frequently than any other type of vehicle.
5. It lasts between two and three times as long as a gasoline truck.
6. It is clean, insuring immaculate sanitary conditions for the goods it conveys.
7. It is quiet.
8. It is odorless.
9. It can be stored at loading platform, saving garage space.
10. It uses power with the irreducible minimum of waste.

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11. It has all the speed that is consistent with prudence in city running and power economy.
12. Employer's control of the speed is inherent in the truck.
13. Its tractive power is greatest in proportion to the horsepower used.
14. Its hazard from fire, accident and theft is lowest.
15. It costs less to run and maintain.

It has been estimated that only 4 per cent of all city trucking is done by electric truck. It has been demonstrated beyond a reasonable doubt that electric trucks are more economical, speedier and better adapted in many ways to more than three-quarters of all city service, namely, the 75 per cent to 85 per cent of such service which involves short hauls or frequent stops.

EVIDENCE FROM OTHER USERS

One inevitably asks one's self the reason for the great economic waste involved in the use of horse and wagon or gasoline trucks on routes which the electric truck could cover at from four-fifths to one-half the cost. It is not ignorance of the long life and low operating and maintenance costs of the electric truck. Every fleet operator reads the technical magazines and knows that the electric truck has a life much greater than the average life of good gas trucks or horses. We know that such well-known firms as John Wanamaker, the Ward Baking Company, the American Railway Express Company, Tiffany & Company, B. Altman & Company, R. H. Macy, Hearn's Store, Horn & Hardart, Marshall Field & Company, the Gorham Silver Company and many others have electric trucks which have been in successful operation in many cities for long periods of time.

But, in spite of all this, the electric truck is used on only about one-twentieth of the routes on which it would render more economical and efficient delivery service than any other transportation unit. Why should thousands of firms defer a change in their delivery equipment which would save them thousands of dollars yearly—in many cases increasing their profits by 20 to 25 per cent and in some cases transferring a yearly loss into a profit? The probable answer is that they do not realize the importance of delivery.

Certainly, if a decrease of delivery costs from one-fifth to one-half is practicable in the businesses named and many others, every proprietor, manager and delivery executive should familiarize himself with the science of transportation engineering. When familiar with these problems he will, no doubt, use electric trucks on the short-haul, frequent-stop routes.

The electric truck is essentially a city delivery unit, and especially economical on house-to-house delivery. It is not the best unit for most of the work the gasoline truck has taken from railroads or created for itself. It is the most economical transportation unit sold for practically all the work still done by horses in cities and large towns. It is the most economical transportation unit for much of the work the gasoline truck has taken from the horse. Three-quarters to four-fifths of all urban goods transportation should be done by electric trucks.

Problem of Selling Service*

Central-Station Company Should Be the Primary Selling Force of the Entire Electrical Industry —Commercial Men of Ability and with Authority Will Produce Results

BY CHARLES J. RUSSELL
Vice-President Philadelphia Electric Company

CONSIDER the subject of service and of its sale as far as its fundamentals are concerned. As a finished product it involves three groups. The first of these deals with the fabrication of machinery, materials and apparatus for the generation, transmission, distribution and measurement of electrical energy. The second or central-station group takes the products of the first group, houses, erects, assembles, operates and maintains the facilities thus created, with the object of delivering kilowatts of capacity of electrical energy. The third group manufactures apparatus and appliances for the translation of electrical into other forms of energy.

C. J. RUSSELL

Selling service is the function of the second, or central-station, group because, with an installation once made, the functions of the first and third groups make continuous sales of electrical energy imperative in the utilization of this installation. The interest of the first and third groups in this initial installation is temporary. When their goods and products have been paid for their transaction is closed. The interest of the second group is permanent.

Recognition of these facts and suitable action in the direction of complete co-operation by all three groups concerned in this cycle of the industry would be important steps toward the exploitation, expansion and development of service sales. Something more than that is needed, however, if the electrical industry is to keep in the very front rank of progress. Within recent years the development of the central-station industry has proceeded at a rapid rate, and this has of necessity been accompanied by rapid growth in the first and third groups of the electrical business cycle. From the great national markets now existing for service sales it would appear, however, that there is little reason for pride or self-satisfaction, except in certain territories, in the present state of development of our business. In fact, those of us who thoroughly analyze markets and progress are constrained to believe that the development of recent years has been external rather than internal and has not resulted from commercial efforts carefully planned and vigorously executed in accordance with a consistent expansion policy.

Selling service to the maximum extent of the ability of the market to absorb and of our ability to supply calls for the nation-wide application of intensive commercial effort. This must begin with a full appreciation of the serious nature of the present situation with respect to the future and with united action upon the

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part of all three groups to co-ordinate their commercial efforts. The first step must consist of a proper recognition of the importance of the commercial branch of the central-station industry in selling service. The commercial branch of our industry must be organized on a basis consistent with the magnitude of our present operations and must prepare to function as an aggressive business-getting organization actuated and governed by the same general principles that prevail in any other competitive business.

Selling service in the central-station industry is a matter of highly specialized salesmanship, requiring broad and up-to-the-minute knowledge of electrical installations and appliances as well as of the results that can be obtained by their use. Properly organized and directed, the commercial branch of the central-station industry becomes the primary selling force of the electrical industry.

Recognition of the importance of commercial effort to the entire electrical industry is needed in and by the commercial branch of our business. Its proper recognition in all matters of policy and development should result in a weighted average of at least 50 per cent as far as importance and authority are concerned, instead of the 10 per cent or less now granted to it.

The entire problem and responsibility for selling service should be assigned to the commercial branch of the central-station group. All selling operations should be placed by each central-station company in the hands of a competent executive officer who should have authority to co-ordinate and administer all functions of selling service. He must be an executive officer, to have a voice and receive proper consideration in all matters of general policy, publicity, public relations, standards of service, schedules or rates.

Selling service is a big job today and will be a very much more important job within a few years. Men of broad vision, great attainments and marked ability are needed, for big results are essential to keep up the progressive development of our industry. Big men to whom proper rank and compensation are given, supported by the management and provided with a competent sales force, will produce big results. Every executive and commercial representative in the three fundamental groups concerned in the manufacture and sale of service should give careful consideration to the facts just presented because the future acceleration of the development of their business depends upon the amount and character of commercial effort put forth by the central station.

IMMEDIATE ACTION NEEDED

The situation is one calling for prompt and intensive commercial effort while the tide of popular favor runs strong. There is now available for service sales by the central station a national market even greater than has been developed in thirty years of continuous growth. Conservative estimates show that the present market possibilities not yet developed represent an annual revenue of more than two billion dollars as against a gross revenue to the central-station companies last year of the order of $1,360,000,000.

To the first group the filling of that market by the central station means at a minimum sales amounting to six billions of dollars. To the third group at least twenty billions of dollars should result from the exploitation of these existing market possibilities.

The question before the entire electrical industry, and especially before the commercial branches of the central station, is: How long shall we take in developing the existing markets for service sales? It will take twenty years at the present rate of development, if we eliminate the normal growth of the business from our calculations.

Most of us are back of the 50 per cent line as far as saturation of the existing market is concerned. The ready market for the normal service of lighting and power has made us near-sighted and we have lost breadth of vision. The recovery of that vision calls for a complete analysis by each commercial organization of its prospective market and a thorough examination of the goods of the utilization group. With this information available, plans for the logical and systematic development of the field should be established and vigorously pushed. Desultory business efforts along the lines of special campaigns for the sale of a featured service must give way to continuous, logically directed sales efforts as the primary objective of our commercial branch.

The existence of great national markets of the extent just mentioned needs no supporting evidence at this time. Thoroughly reliable data are available to confirm the figures, notably those gathered by the statistical forces of the electrical press and of our great national societies. The vital question before each commercial manager is the size and character of the market in his territory. Exact knowledge worthy of presentation to central-station executives can be obtained only by a survey of the market possibilities in every class of business. This must cover not only new installations but the possible extended use if lighting, power and heating operations were developed to their maximum.

The whole industry faces the necessity for a program of expansion in selling service because in this way alone can speed and stability be brought about. Adequate commercial organization is the first and most important step to be taken. In the central-station industry the organization must be based upon the present level of $1,360,000,000—not upon the pre-war basis of $600,000,000.

In conclusion, it is the firm conviction of the author that, first, selling service will be a deciding factor in every question concerning the future size and importance of the electrical industry; second, selling service and organization to do the job right are at this time the most vital questions before the central station industry; third, selling service, in its present position of importance to the whole industry, calls for renewed enthusiasm, intensive effort and full co-operative action upon the part of every member of the Commercial Section; fourth, selling service, not dispensing service, and aggressive business getting, not order taking, must, for the good of the whole industry, be adopted as the policy of every central station, and a competent personnel must be provided to carry out this policy. The monopoly of market enjoyed by any public utility carries with it an absolute responsibility for the development of that market to the full service of the public. That obligation calls for commercial effort of the same definite, intelligent and persistent kind that prevails in any business enterprise of a highly competitive character. Living up to that obligation is the only line of action that will bring real success in proper measure to the electrical industry.

High-Voltage Cables*

National Electric Light Association Underground Systems Committee Discusses Paper Cable Insulation, Cable Splices and Splicing Methods and Cable Operation —Candid Opinions on the Situation

THE result of operation of a number of high-tension cables on 20,000-volt to 33,000-volt systems during the past year has, in the opinion of the underground systems committee of the National Electric Light Association, been such as seriously to alarm engineers in charge of this phase of the industry. Neither the N. E. L. A. cable specification which has been in use for the past few years nor any other specifications of which the committee has knowledge always insures a dependable product, notwithstanding that specified initial tests thereon may be very successful.

The committee states that power-transmission cables whose characteristics change for the worse with time or with continuous electrification or loadings are not satisfactory and do not reflect credit on either the manufacturer or the purchaser. It says that the central-station representatives on the committee, particularly those who are most conversant with the subject, are strongly of the opinion that the fundamentals of high-voltage cable design are not fully understood by the majority of American manufacturers. On the other hand, certain of the committee members who have been abroad during the past year, visiting cable manufacturers and comparing experiences with cable engineers, have returned to this country with the contention that foreign practice is superior to American. However, whether this idea be correct or not matters little if the experience abroad does not give sufficient data to find out facts and apply remedies.

W. H. COLE
Chairman Underground Systems Committee, N. E. L. A.

The committee recommends that the research work now in progress be broadened to include a very comprehensive program, including research involving raw materials, and that the manufacturers should co-operate very actively in the work. The committee says further that, considering the millions of dollars already invested in transmission cables and the money that is expended each year, it appears to be no less than a positive economic crime that the reliability of certain cables is so short and their expected life so uncertain. On the other hand, it states that the demand upon the manufacturers for low dielectric losses and low power factor may have caused them to progress too fast in that particular direction at the expense of some equally important characteristics of the finished product.

The committee recommends that consideration be given to the effect of mechanical stresses incidental to the installation of high-voltage cables. This recommendation is made in the light of the report that the better performance of high-voltage cables abroad occurred because of the tender installation methods.

*Report presented before forty-seventh convention of National Electric Light Association, Technical Section, at Atlantic City, N. J., May 19-23.

Research work on cable insulation has been carried on at the Massachusetts Institute of Technology during the past two years. The complete investigation will not be finished until May, but tentative conclusions drawn by the sub-committee are as follows: (1) The dielectric strength remains practically constant if the cable is not subjected to mechanical stresses. In other words, the maximum temperature at which cables may be continuously operated is not determined by the decrease in dielectric strength. (2) The folding endurance falls off most rapidly, and this is therefore the most sensitive point reached in the four mechanical tests of the paper which were made. (3) There is apparently no marked difference between the rate of deterioration of a paper saturated with mineral-base compound and one saturated with a vegetable-base compound, nor is there apparently any appreciable difference between the results obtained from samples of high-voltage cables and of low-voltage cables or between old cables and new cables, or in the average deterioration of all of the samples at 80, 90 and 100 deg. C. respectively as shown by the per cent decrease in bursting strength, tearing strength, tensile strength and folding endurance respectively. Also, the average deterioration of all of the samples at 80, 90, 100, 120 and 140 deg. C. as indicated by the average of the results of all four mechanical tests was determined. From these data deductions were made as to the rate of deterioration so far as mechanical strength is concerned, subject to confirmation or otherwise in the final report. These deductions are contained in Table I.

In the samples that were included in the first investigation the paper was composed of pure manila hemp-rope fiber, but in future tests it is hoped to extend the test to cover paper made from wood-pulp.

The committee hopes to recommend soon some maximum values of dielectric loss at various temperatures which might be included in cable specification. It also states that investigation indicates that ionization in high-voltage cables can be eliminated or at least greatly reduced by thorough impregnation of the insulation. The committee also contemplates the elimination from the N. E. L. A. cable specifications of the clause which requires the use of manila hemp-rope-fiber paper.

TABLE I—DETERIORATION IN PER CENT
(Average of all samples for all mechanical tests)

Temperature, Deg. C.	Approximate Number of Weeks	Deterioration, per Cent
80	18	10
90	18	17
100	13	25
120	1¼	20
140	4	90

Since several companies have experienced failures during tests of cable immediately after installation and within a short time after it has been placed in service, although the cable had passed all the regular and special tests required to be made at the factory, it seems that the high-voltage test now specified must be increased or additional tests must be required in order to insure satisfactory operation of the cable.

The reports indicate that the ratio of the number of failures, taking into account the linear dimensions only of joints compared with that of cables, is enormously greater than ought to be expected. Cable joints have been and now are to a greater or less extent the product of workmen carrying on their work under very poor conditions for high-class insulating processes, and therefore it is not to be wondered at that the ratio of joint failures to cable failures is large. On the other hand, haphazard planning and design undoubtedly have been responsible for a great number of preventable joint failures. At present, however, there is a legitimate trend on the part of cable engineers toward the design of joints which will not ordinarily fail except from mechanical injury. The committee recommends that company executives attach more importance to the necessity of there being an adequate force in charge of this very important phase of the industry.

For operating voltages up to about 22,000 almost any kind of joint is fairly satisfactory, provided that the dimensions are reasonable and the degree of filling and grade of materials and workmanship are reasonably good. As the voltage increases more attention must be paid to fundamental principles. The design, dimensions and dielectric-stress field must be more scientifically proportioned and the grade and type of material must be more carefully chosen.

The defects of hard-rubber-compound fillers for high-voltage cable work, such as the formation of voids and cracks due to shrinkage, are now generally recognized, and there is rapidly spreading a tendency toward the use of soft compounds. The lateral weakness along the surfaces of paper wrapping is also recognized, and various methods are used to overcome this.

About 90 per cent of the companies use tape joints and filling compounds for the lower voltages. For the higher voltages about 50 per cent use tape joints and filling compounds. However, in the highest voltage range, 26,000 to 35,000, only two out of eight companies report the use of a tape joint. Six of the others use insulating tubes of the cell-type joint, that is, a factory-made joint.

Hard filling compounds are in most general use, and about one-third of the companies are using paraffine for the lower voltages. The tendency for the extra-high voltages is to use a mineral-oil compound of low viscosity. In order to fill the joints properly most companies are pouring through the joint a considerable amount of compound, especially in filling high-voltage joints. The use of the vacuum or pressure process in filling has been practically eliminated by the companies from which replies were received. Inquiries relative to migration of compound from the joints causing failure indicate that none of the companies has experienced difficulty due to this cause, but a few report failures in the cable adjacent to the joints and attribute them to compound migrating from the cable into the joint because the joint was below the level of the duct.

TABLE II—SUMMARY OF CABLE AND JOINT FAILURES IN THREE-CONDUCTOR CABLE, CLASSIFIED ACCORDING TO VOLTAGE

	6,000-15,000 Volts						20,000-33,000 Volts					
	1923	1922	1921	1920	1919	Ave. per Year	1923	1922	1921	1920	1919	Ave. per Year
Number of companies reporting	12	20	19	12	12	.....	10	9	11	8	8	.....
Miles of cable	4,755	4,964.5	4,128.8	3,457.5	3,348.4	.....	617	578.2	546.7	525.8	466.2	.....
Number cable failures	443	469	410	254	148	.....	37	37	57	30	56	.....
Number joint failures	147	118	143	133	73	.....	33	32	49	34	34	.....
Total number failures	590	587	553	387	221	.....	70	69	106	64	90	.....
Number joint failures per 100-mile cable	3.1	2.4	3.5	3.8	2.2	3.0	5.35	5.5	9.1	6.5	7.3	6.75
Number cable failures per 100-mile cable	9.3	9.5	9.9	7.4	4.4	8.1	6	6.4	10.4	5.7	12	8.1
Total number failures per 100-mile cable	12.4	11.9	13.4	11.2	6.6	11.1	11.35	11.9	19.4	12.2	19.3	14.83
Number joint failures per 1,000 joints	1.6	1.15	.....	.....	.....	1.37	2.36	3.5	.....	.....	.....	2.93

TESTING OF JOINTS

An outline of tests recommended for cable joints from a 60-cycle supply is as follows:

1. Four times working voltage for thirty seconds followed by geometric increases of 10 per cent in voltage at thirty-second intervals.
2. Three times working voltage for one hour followed by geometric increases of 10 per cent in voltage for one-hour intervals.
3. Two and one-half times working voltage for two hours followed by geometric increases of 10 per cent in voltage with decreasing time intervals, each time interval being 25 per cent less than the previous one.
4. Test for a half hour or so at three or four times normal voltage followed by about 15 per cent increases in

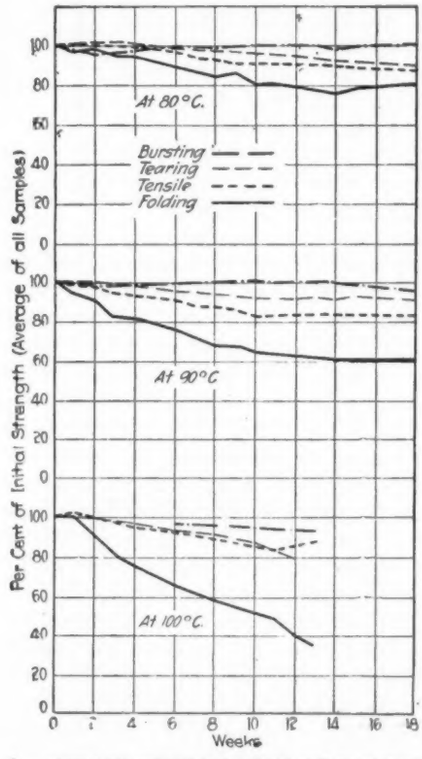


FIG. 1—AVERAGE DETERIORATION OF SAMPLES FOR DIFFERENT TESTS

voltage with intervals of two to four hours at the latter voltages.

5. Accelerated light test at about two times normal voltage.

The committee suggests the following tentative specifications for compound for high-voltage joints:

1. It shall be free from all foreign matter, acids and alkalis as received from the manufacturer.

2. It shall have as far as practicable no chemical change or physical separation between — 25 deg. C. and the temperature of 20 deg. C. above the pouring temperature of the compound. The per cent volatile matter as determined by heating the compound to 20 deg. C. above the pouring temperature for thirty minutes shall be as low as possible, and the resistivity of the compound after such heating shall not decrease more than 25 per cent.

10. The dielectric strength of any mixture of the filling compound and the cable impregnating compound shall not be less than the dielectric strength of the weaker (electrically) of these two compounds.

11. The power factor of the charging current of the compound shall be determined between zero and 100 deg. C. and shall not exceed the following values: Temperature of compound, 0 to 60; power factor of charging current, 4 per cent; temperature of compound, 80 deg. C.; power factor of charging current, 8 per cent; temperature of compound, 100 deg. C.; power factor of charging current, 16.

12. The specific inductive capacity of the compound shall be determined at temperatures from 0 to 100 deg. C. at 60 cycles. If not otherwise indicated, it should be about 2.5.

A review and study of the general performance of high-tension cables during the past few years has been of considerable interest, and the record is alarming in that many instances of failure have been indicated. Voltages below 20,000 have been very common and are used extensively for underground cable systems. Almost 5,000 miles has been reported as in operation, but in the opinion of the committee the performance of these cables cannot be pronounced satisfactory. Failures in this class have been between 11.9 and 12.4 per 100 miles for the past two years, as seen from Table II.

TABLE III—1923 PERFORMANCE OF HIGH-TENSION THREE-CONDUCTOR CABLES (20,000 TO 33,000 VOLTS) IN REGULAR OR EXPERIMENTAL OPERATION

Company	In Commission	Miles	Voltage	Size	Conductor	Total Insulation (64ths)	Volts per Mil Between Conductors	Volts per Mil Conductor to Sheath	Total Breakdowns per 100 Miles for 1923	Permissible Duct Temperature, Deg. C.
A	August, 1917	8	26,400	4/0	.....	18 x 10	46.9	34.8	0	40
B	January, 1920	27	25,000	300,000 circ.mil	Sector	18 x 12	44.5	30.9	14.8	..
C	.....	67	20,000	2/0	Round	18 x 30	35.6	15.4	13.4	..
	About 5 years	8	22,000	350,000 circ.mil	Sector	19 x 7	37.0	31.2	32.5	40
	May, 1923	86.4	33,000	350,000 circ.mil	Sector	19 x 7	55.5	46.8	33.6	..
D	.....	3.1	22,000	No. 2	Round	20 x 20	35.2	20.3	32	..
E	1907	394	24,000	2 0-1A0	Round	18 x 14	42.8	27.7	5.6	50
F	1918	10.2	26,400	2 0-300,000 circ.mil	Sector	19 x 18	46.4	27.5	88	..
				350,000 circ.mil	Sector	19 x 12	46.4	32.8	....	....
G	1917	19	26,400	2 0	Round	20 x 10	42.3	32.6	15.8	55
				250,000 circ.mil	Sector	20 x 10	.....	.....	.....	.....
				350,000 circ.mil	Sector	20 x 10	.....	.....	.....	.....
H	1920	12	25,000	350,000 circ.mil	Sector	17 x 8	47.0	36.8	33.3	45
I		35	22,000	250,000 circ.mil	Sector	18 x 10	39.2	28.9	0	9
J	November, 1921	0.2	27,000	1/0	Round	20 x 10	43.3	33.3	....	....
K	1912	28	23,600	2/0	Round and Sector	18 x 14	42.0	27.2	68	55

3. It shall not affect injuriously the electrical, physical or chemical properties of the cable insulation or any other insulation such as varnished cambric, factory-formed insulators, paper tape, cotton wicking, etc., when it is poured into the joint.

4. The compound as poured into the joint shall contain no material which will deteriorate owing to the lapse of time or be subject to mechanical, physical or chemical changes resulting from dielectric stresses and temperatures incident to the normal operation of the joint.

5. The flash point of the compound shall be as high as practicable and shall be at least 190 deg. C.

6. The pouring temperature of the compound shall be as low as possible and shall not be more than 150 deg. C., and the temperature of the compound at the outlet hole of the joint shall not be less than 105 deg. C. At the pouring temperature the compound shall be so fluid that it will readily flow into all parts of the joint and displace all air. The viscosity of the compound at the pouring temperature by Saybolt test shall not be more than sixty seconds.

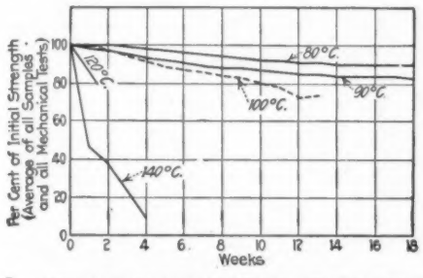


FIG. 2—AVERAGE DETERIORATION OF SAMPLES FROM AVERAGE TEST RESULTS

7. The coefficient of expansion shall be as low as practicable, and it shall be less than 0.0010 between — 10 deg. and + 100 deg. C.

8. It shall not develop any cracks during operation in the joint at a temperature as low as —10 deg. C.

9. The dielectric strength shall be determined on samples of the compound at 25 deg. and 100 deg. C. It shall be as high as possible and not less than 25,000 volts when tested with a standard 0.1-in. gap between 1-in. disks with a 60-cycle supply.

Cables operating at voltages above 20,000 have been quite common, if not so extensive in mileage as the lower class. Above 600 miles is in operation, and, as seen from Table II, the performance of this higher class of cable has been of the order of eleven failures per 100 miles during the past two years, which is somewhat better than the lower class of cable. This performance, however, should fall below ten failures per 100 miles per year, according to the opinion of some operating engineers.

In a study of the nature of faults and a comparison between cable and joint failures, considering all voltages, 6,600 to 33,000, joint failures represent about 27 per cent and cable failures about 73 per cent of the combined failures. In the class above 20,000 the joint failures represent about 43 per cent and cable failures about 57 per cent of the total failures, thus indicating joint failures to be more numerous in the higher-voltage class.

Above 600 miles of high-voltage cable has been installed, some of which has been in service since 1907. Of this amount about 400 miles, or two-thirds of the total combined mileage, is being operated by one company alone, and all at 24,000 volts. The remainder, or 200 miles, is scattered among several other companies, with systems containing from less than one mile to 86 miles of installed cable and operating at voltages varying from 20,000 to 33,000.

Table IV—Record of Cable Failures for Year 1923 on Cable Systems at Voltages of 6,600 and Over

Company	Miles of Cable	Voltage Between Phases	Total No. Joints	No. of Failures (1923) Cable	Joint	Total	Cable and Joint Failures: Per 100 Miles Cable 1923	1922	1921	1920	1919	1918	Average No. Failures per Year	Per Cent. Increase or Decrease for 1923 from Average	No. Joint Failures per 1,000 Joints	Cable Purchased Under N. E. L. A. Specifications: Miles Cable	No. Failures	No. Per 100 Miles 1923	1922	1921
Baltimore	8	26,000	73	0	0	0	0	0	15.1	9.2	49.2	...	14.7	...	0	...	No	...	...	...
	274	13,000	5,470	12	8	20	2.9	13.1	20.1	8.4	7.5	13	10.8	—73%	.15	65	Rec.	...	...	...
*Boston	27	25,000	.....	4	0	4	14.8		7.4	14.3	...	...	12.2	+21%	...	...	...	...	...	...
	468	13,800	.....	35	17	52	11.1	15.5	10.5	16.0	7.6	9.1	11.6	—4.3	...	...	...	...	...	...
	46	6,900	.....	2	0	2	4.3	0	13.2	13.9	7.1	13.2	8.6	—50%	...	...	...	...	...	...
Brooklyn	163	13,000	3,150	1	21	22	13.5	4.9	.....	...	...	...	...	+50%	6.7	...	...	...	...	...
	350	6,600	6,728	13	5	18	5.1		.....	...	...	...	...		.74	...	...	...	...	...
Chicago	1.6	33,000	19	0	0	0	0	0	.....	...	...	...	0	0	0	.6	0	0	25	0
	8	22,000	138	2	1	3	32.5	11.1	.....	...	...	...	2.8	+49%	7.25	8	2	25	5.7	0
	67	20,000	1,179	6	3	9	13.4	8.1	4.5	17.5	71.	10	20.7	—35%	2.5					
	553	12,000	9,726	65	26	91	16.4	18.1	16.3	22.0	21.7	5.8	16.7	—1.8%	2.7	174	21	12	4	10.2
	392	9,000	6,900	23	3	26	6.6	7.8	5.2	4.0	4.9	2.7	5.2	+27%	.43	69	2	2.9	3	0
Cleveland	3.1	22,000	.....	1	0	1	32	0	125.0	0	0	...	31	+3%	...	...	...	...	...	...
	577	11,000	12,175	45	4	49	8.5	6.2	8.7	3.5	2.4	...	5.8	+47%	.33	...	...	...	...	...
Detroit	394	24,000	10,700	15	7	22	5.6	7.2	13.9	4.4	8.5	11.2	8.5	—34%	6.5	Insu ava	fficie ilabl	nt d e	ata	
Milwaukee	10.2	26,400	211	2	7	9	28	147	67.5	...	...	...	100.8	—12%	24.6					
	162	13,200	2,930	18	12	30	18.5	17.5	18.5	...	...	...	18.2	1.6%	4.1	8	0	0	...	...
Newark	10	26,400	330	2	1	3	15.8	103					59.4	—73.5%	3.3					
	258	13,200	4,600	103	4	107	41.5	23.1	14.8	11.6	10.8	27.7	21.6	+395%	.87	...	...	...	...	...
New York	†33	45,000	600	4	1	5	15.1						15.1		1.6					
	12	25,000	249	3	1	4	33.3	8.2	16.4	16.4	...	...	18.6	+79%	4					
	45	15,000	998	3	0	3	6.7	6.8	17.6	39.2	...	...	17.6	—62%	0					
	285	13,200	5,843	19	16	35	12.3	9.1	9.8		...	...	10.6	+16%	2.76					
	337	11,000	7,526	14	5	19	5.6	8.8	2.9	0	0	...	3.5	+60%	.67					
	122	7,800	2,623	3	2	5	4.1	8.1	5.6	16.9	...	...	8.7	—53%	.77					
	322	6,600	7,171	20	2	22	6.8	6.5	5.3	1.4	...	...	5.0	+36%	.28					
Niagara Falls	78.7	12,000	1,400	6	7	13	17.1	5.5	8.8	...	...	...	10.5	+63%	5	...	...	...	...	...
Philadelphia	315	13,200	4,626	17	8	25	7.9	5.6	12.7	44.6	...	...	17.7	—55%	1.7	Bega	n in	1921		
	60	6,600	791	15	7	22	31.7	28.4	36.7	18.2	...	...	28.7	+10.5%	.88	Insu ava	fficie ilab	nt d le	ata	
Pittsburgh	35	22,000	774	0	0	0	0						0		0	6	0	0		
	137	11,000	2,890	26	3	29	21.2	34.1	34.0	22.4	.8	39	25.2	—16%	1.07	5	1	20	...	...
St. Louis	.2	27,000	3	0	0	0	0						0		0	6	0	0		
	156	13,200	2,285	31	9	40	25.6	18.8	52.4	...	...	...	32.3	—20.7%	.39	13	1	...	0	10
	19	6,600	276	0	0	0	0	0	.....	...	...	...	0	0	.....					
San Francisco	150	11,000	2,934	9	5	14	9.3	8.2	11.1	...	...	...	9.5	2% 1.	7	10	0	0	...	...
Toledo	28	23,600	725	6	13	19	68	37	103.7	56.7	88.0	11.1	60.7	+12%	18	...	...	...	...	...
Total	5,374.8	.....	106,043	484	181	665	11.5	11.8	14.1	11.3	8.2	13.1	11.7	.....	1.7	359.6	27	9.2	3.1	5.3
Col. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Cause of Cable and Joint Failures 1923

Company	1 Electrolysis C	1 Jt	2 Damaged by Adjacent Cable Failure or Exterior Fire C	2 Jt	3 Lightning or High-Voltage Disturbance C	3 Jt	4 Sharp Bend in Cable C	4 Jt	5 Wearing at Duct Edge C	5 Jt	6 Vibration or Contraction and Expansion C	6 Jt	7 External Mechanical Injury Other than shown in 1 to 6 C	7 Jt	8 Overloading of Cable C	8 Jt	9-A Overheating Not Due to Overloading. A—Steam Pipe; B—High Dielectric Loss C	9-A Jt	9-B C	9-B Jt	10 Moisture Attributed to Causes Other than shown in 1 to 9 C	10 Jt	11 Deterioration of Old Insulation and Obsolete Style Joint C	11 Jt	12 Defective Factory Product or Material C	12 Jt	13 Poor Workmanship in Installation C	13 Jt	14 Routing High-Voltage Tests (Not Including Accepted Tests) C	14 Jt	15 Miscellaneous Known Causes C	15 Jt	16 Unknown Causes C	16 Jt
Baltimore																																		
	1	0	2	2	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	1	0	4	1	
*Boston																																		
	2	0	1	0	0	0	0	0	3	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	2	0	21	22
Brooklyn																																		
	4	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0	0	2	0	0	0	1	0	0	0	0	5	23
Chicago																																		
	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	1	0	0	2	1	0	0	9	0	0	0	0	0	3	0	0	0	0	20	0	0	0	0	0	4	11	5	0	12	0	0	1	3	0	0
Cleveland																																		
	13	0	7	1	0	0	3	0	0	0	0	0	6	0	0	0	5	1	0	0	1	0	0	0	1	0	0	2	0	0	0	0	10	0
Detroit																																		
	5	0	2	1	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	3	4	1	0
Milwaukee																																		
	2	0	3	0	0	8	1	0	0	0	0	0	1	1	1	0	3	0	0	0	0	2	0	0	4	0	0	2	0	0	0	0	5	0
Newark																																		
	1	0	8	0	3	0	3	0	7	0	0	0	20	0	0	0	4	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	53	5
New York																																		
	4	0	1	0	0	0	4	0	12	1	0	0	25	1	3	0	0	0	0	0	0	0	2	6	18	5	0	0	4	0	0	0	6	1
Niagara Falls																																		
	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	0	0	0	0	0	0	0	0
Philadelphia																																		
	6	0	0	0	2	0	1	0	3	0	0	0	4	3	0	0	0	0	0	0	1	0	0	0	0	0	3	2	0	1	8	5	0	0	5	3
Pittsburgh																																		
	7	0	0	0	2	0	0	0	0	0	8	0	3	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	4
St. Louis																																		
	13	0	0	0	2	2	2	0	1	0	0	0	0	1	4	0	3	0	1	0	0	0	1	0	0	4	0	0	0	0	0	0	5	1
San Francisco																																		
	1	0	0	0	0	0	0	1	0	0	0	0	3	0	0	0	2	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	2	2
Toledo																																		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13
Total	57	0	26	5	9	10	23	1	36	1	10	1	106	10	15	4	20	1	27	1	9	6	7	28	24	18	0	27	8	5	4	8	103	56
Col. No.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54

2 Not included in summary. 1 Single conductor.

The highest-voltage three-conductor cable is 33,000 volts, about 88 miles being installed, but only partly in commission and for approximately only one year. The highest-voltage cable in commission in single-conductor cable is operating at 45,000 volts between phases or 26,000 volts to ground. About 33 miles or 11 circuit miles of this is in operation, but it may be considered to be in the experimental stage, having been in service less than one year and with some failures.

The performance of neither the 33,000-volt three-conductor nor the 45,000-volt single-conductor cable has been included in the record because of their experimental nature, they not being completely satisfactory for the regular service requirements.

A careful study was made of the operating temperatures of duct lines and methods of making temperature determinations, and in addition the various ways of testing cables and test specifications were thoroughly treated by the committee in its report. Another subcommittee discussed very thoroughly cable manholes, conduit construction and methods of installing cables in underground systems.

Mutual Rights and Duties of Utilities on the Highways*

No Utility May Interfere Unnecessarily with Proper Use of Public Roads by Another—Priority of Occupancy Carries with It No Superiority of Right—Inductive Co-ordination Work with Telephone and Signal Lines

By David F. Simpson

Former Associate Justice of the Supreme Court of Minnesota

A COMMON understanding of mutual rights and duties is the first requisite to the elimination of controversies growing out of any relationship. Moreover, such common understandings must continually be developed, because new situations involving mutual rights and duties are continually arising. The price we must pay for the conveniences, luxuries and opportunities of our modern civilization is the loss of the unlimited rights of the primitive man. Even the rights guaranteed by our Constitution are not unlimited rights. The pursuit of happiness must be conducted along ordered lines. We no longer have the right to create a monopoly, to combine to restrain trade or control prices. We must not indulge in unfair competition.

Public utilities have been especially involved in this trend of narrowing rights and broadening duties. Increasing public needs and demands create both opportunities and limitations. The enforced rubbing of elbows of utilities meeting diverse public demands requires continual readjustment of methods and practices. Every such readjustment has been attended with trouble, irritation, controversy and conflict.

Fertile Field for Conflict

No more fertile field for such conflicts exists than highways, with continually increasing, diversified uses. Admittedly, the use of highways in common by power and communication utilities renders necessary methods and practices different from those which were proper when one utility had the sole use of a highway. The necessary readjustment of methods used on highways occupied by different utilities is still in the formative, controversial stage. There is as yet no common understanding of the mutual rights and duties. No legal principle or rule has been uniformly established or uniformly recognized to govern the common use. Yet from a consideration of the nature of highways and the basis of their permitted use by utilities such a governing principle and rule may be evolved, and such rule will undoubtedly in time be uniformly recognized and established.

Highways for Service Use

A highway is a public way, common to all the people. Originally a highway was devoted to travel, but gradually it became utilized for a variety of other purposes incidental to the progress of the arts and the multiplied wants of man. The possible uses of the highway were not known or dreamed of when highways were first created. But it has become the settled law that the public easement is not limited to the particular methods of use in vogue when the easement was acquired. The new method of use need only be compatible with other recognized uses and the rights of the abutting fee owner. It has always been and must continue to be a use for the public, for the common service of all the people. Use of a highway by utilities, while of advantage to owners of the utilities, is nevertheless a public use, permitted and justified solely by a resulting service to the public.

As utilities occupy highways only by permission of the public and to render a service to the public, the permission should be broadly given so as to make possible the greatest service. Therefore grants from the state of the right to occupy the streets should be without priorities and conditioned only to prevent unreasonable interference with travel and other permitted uses. Minnesota, consistently with this principle, by statute permits "any water power, telegraph, telephone, pneumatic tube or light, heat or power company" to use "public roads for the purpose of constructing, using, operating and maintaining lines, subways, canals or conduits for their business," only requiring that "such lines shall be so located as in no way to interfere with the safety and convenience of ordinary travel over the same." Other states, either

*Abstract of an address delivered at the forty-seventh convention of the National Electric Light Association, Technical Section, Atlantic City, N. J., May 19-23, 1924.

directly by the Legislature or through subordinate bodies, have like permission.

Unless the grant of the right to use the street creates by its terms some inequality in such right as between utilities, it seems clear on principle that no such inequality may be inferred. Neither the utilities themselves nor commissions nor courts should attempt to create superiorities because of some opinion entertained by them of the relative importance of the different services.

When the advent of electric street railways wrought havoc with the ground returns of communication lines, it was claimed in the resulting litigation that as electric railways directly aided travel—the primary highway use—their rights in the street were superior to the rights of communication utilities and that the latter could not restrain conductive interference with ground returns, and several courts approved of this claimed superior right. But it was also announced in these cases that a telephone company, through permission given it to occupy a street with its poles and wires, did not acquire a proprietary right in an undefined uncharted portion of the earth through which its return current passed, and that another utility owed to it no duty to avoid conductive interference with such grounded system. This is the controlling principle in these cases, rather than an inequality of rights in the street.

NO SUPERIOR RIGHTS FOR POWER

Power companies have also claimed superior rights for their transmission lines over communication companies because the power was used for lighting streets and in some cases for propelling street cars. But this claim, while plausible, has no sound basis. The streets are for the use and benefit of the public. The public, for its benefit, permits a telephone company to place poles and lines on the street. A power company or street railway company using the street solely under like permission from the public cannot say that its permitted occupancy of the street is superior to the permitted occupancy of the street by the telephone company. Courts will not ultimately so hold, it is confidently believed. In determining the mutual rights and duties of utilities in the highway, we may safely start with the premise that the rights of utilities permitted to use the highway, having as the common basis public need and the public's permission, are inherently equal, each to each.

These considerations as to nature of highway and basis of permitted use make clear the mutual rights and duties of utilities in the highways:

Each utility using the highway must use it in such a manner as not to interfere unnecessarily with the proper use of the highway by another utility. This rule involves no novel principle. It has been announced as applicable to persons using the highways ever since legislative bodies have passed or courts have announced rules for the use of highways. In every case involving an injury on the public highway it is under this principle that the injured party either succeeds or fails to recover resulting damages. Pedestrians, automobiles and street cars all have equally the right to use the street, and each is bound in using the street to exercise reasonable care not to interfere with the rightful use by others or to cause self-injury or injury to others. A failure to exercise such care which causes injury subjects the negligent street user to damages measuring such injury. This principle or rule, if correctly understood and fairly applied, will solve most of the present disputes over the common use of highways by utilities, although necessarily the rule does not state or define the particular practices which fall within or without the rights of a utility on the highway. The extent of the regulatory power of the state, rather inaptly called the police power, admits of no defined boundaries. The state may regulate or prohibit for the general welfare. What particular practices may be prohibited can only be determined when an actual situation is presented. So unfair competition is its own definition, and whether a specified practice falls within or without the field of fair trading depends upon the circumstances and the actual results of the practice. Yet both the extent of the police power and methods of unfair competition are generally understood, and except in border cases each affords a sufficiently definite guide for business activities.

AN UNFORTUNATE TENDENCY

The chief difficulty in applying this rule to an actual situation lies not in the general terms of its statement, but rather in the executive officers' conception of the utility's rights in the highway and their resulting attitude. There is undoubtedly a tendency on the part of executives to consider that their utility has proprietary rights in and to the highway. They regard interference by another utility with their use of the highway as an invasion of their proprietary rights. Rights in the highway are considered substantially the same by them as rights in privately owned power plants or rights-of-way. Even commissions and courts have frequently, in decisions upon highway uses and interferences, apparently considered that the interests of the utility as an entity were of chief importance, rather than the interests of the public receiving service. Such view is subversive of the true principle. If one utility unnecessarily interferes with another in the highway, it thereby interferes with the public served by that utility. If the utility does not so adapt its use of the highway as to permit a reasonable use by another, it thereby bars to some extent the public from the use of that highway. A utility cannot at once affirm and deny the public right, affirm it as to its own representative public right and deny it as to another utility's representative public right.

The rule that each utility using a highway must use it with reference to the reasonable use by other utilities necessarily excludes any method of using a street that is inconsistent with other reasonable existing methods of use of that street. It almost in terms prohibits the maintenance in the street of an obsolete or defective system which cannot exist alongside of or which injures a permitted modern, properly maintained system. There is no difference in principle between defects due to lack of maintenance and those due to obsolete type which either cause injury to another or result in self-injury. In either case the failure in duty and the responsibility for resulting loss rests on the company using the street in a manner inconsistent with the proper use of the street by others. Manifestly a utility using a highway has no grounds of complaint because of the fact that its own improper use of the highway results in its own injury. It has grounds of complaint if it is injured by the improper use of the street by

another utility. Each utility, therefore, should exercise care, skill and expert knowledge to make the manner of its occupancy of the highway in respect to construction, maintenance and proper co-ordination consistent with the use of the street by other permitted systems. Nothing short of this is the performance of its duty to other utilities or to the public.

Because of the differing characteristics of communication and power lines—the former operating with low energy and sensitive apparatus and being very susceptible to interference, the latter operating with high voltages and abundant energy and inherently creating about itself a field of inductive influence—interferences in the highway and difficult problems more frequently occur between power and communication lines than between two power lines or between two telephone lines, although the records of court cases show that rival signal companies and rival power companies have occasionally indulged in protracted and bitter controversies over mutual rights on public streets. The fact that in case of interferences between power and communication systems the resulting injury falls almost wholly on the communication line does not in any degree lessen the duty of the power company to do its part to prevent the injury. Neither does it absolve the communication system from its duty to do its part to prevent the injury. The signal line cannot capitalize its weakness any more than the electrical supply line can take advantage of its strength. Each must do its part toward the full performance of the mutual duties. Each must occupy the highway with a line, as to type and maintenance, suitable to the joint occupancy, and each must co-operate in approved practices to avoid unnecessary interference.

While this rule, resting on equality of right and equality of duty, may be applicable when utilities enter the highway at the same time, it is not applicable in cases where one utility establishes itself in the highway before the other. This claim is continually made and, if valid, has far-reaching results.

Priority of Occupancy

Does priority of occupancy establish superiority of right? The claim of a superior right in the highway through occupancy involves the conception that the occupancy of the highway is an appropriation by the utility of that highway to some extent. Being manifestly against the public right, there can be no such appropriation. The appropriated part would cease to be a part of the highway. This is what occurs in occupying mining claims, homesteads and similar properties. Through occupation and certain formalities the public ownership ceases and a private ownership is established. but this cannot take place as to a highway. It remains public, to its entire extent and for all purposes, after occupancy, the same as before occupancy. Not only is there no acquisition of title to part of the highway by occupancy, but a utility acquires no perpetual right to maintain its poles in a certain position or its wires at a certain height or to continue a certain type of construction. The permitted use is from day to day. This does not mean that the public, having granted the use, may arbitrarily exclude a utility from the highway and thus destroy its property right, but it means that the public has a continuing control of everything affecting the general use of the street. It may exclude a type of line today that it permitted yesterday, and it may do this either by direct regulation or by permitting the use of the highway by another utility. Any method or practice adopted by a utility first occupying the road that unnecessarily interferes with a permitted occupancy of that road by another utility conflicts at the time of the interference with the public control of the street. The interference, rightly viewed, is between the first utility and the public, and not between the two utilities.

Where, by a general grant of permission, different utilities are permitted in the highways, the idea or claim of an exclusive right of use by one utility is expressly negatived by the general permission. Even where the grant to one utility, as well as the occupancy, precedes the grant of permission to the other utility, the result is the same. The original grant of use does not usually purport to be the grant of an exclusive use. Even if it did, the exclusive feature would be invalid. The state holds the public easement in highways in trust for the public. It cannot barter it away or limit the public right. Whether expressed or not, the power is necessarily reserved in the state to permit all public uses of the highway not inconsistent with the general use or with the rights of abutting owners. Under this reserved power the subsequent grant of permission to use a highway stands on a par with the prior grant.

Physical properties constructed by one utility in the street cannot be removed or injured by a second utility, but even this does not indicate a superior right in the highway. It shows rather certain advantageous incidents of prior occupancy arising from the fact that two bodies cannot at one time occupy the same space. Men have equal rights on the sidewalk. Under that equality one man cannot push another off the sidewalk and occupy his place. But, even so, one man may not stand on the sidewalk in such a way as unnecessarily to prevent others from traveling on the walk. So the prior utility cannot, even as to its physical property, unreasonably interfere with others, cannot maintain poles and wires so located as to prevent the location of other poles and wires on the street. The right of the prior company to non-interference with its physical property is a legal absolute right easily determined and capable of exact enforcement. A number of related rights and duties, such as placing or joint use of poles and transposition of wires, involve agreement and mutual adjustments. There is no exact legal duty involved. The obligation is in the nature of a moral obligation to live in harmony on the street and to give the public the largest possible service.

Grounded Telephone Lines

It may be said that these general principles governing highway occupancy do not give due consideration to the public receiving service from the utility first in the street, for example, patrons of rural grounded telephone lines. Such lines have been the sole utility occupant of many highways for years. They cost less than metallic circuits, are more easily maintained in a fairly usable condition and give a satisfactory service at a low cost. This low cost has made possible or at least has induced a very general use. So long as such a line has the highway to itself its troubles, if any, are internal and cheerfully borne, but if a power line parallels it, immediately the telephone absorbs troubles from the outside which are neither easily nor cheerfully borne. The situation is charged with trouble.

The single wire line does not admit of transposition. Even though both lines are in good repair and on opposite sides of the highway, they together create a common electric field. The two lines are inductively coupled with each other. The susceptible line suffers in function, and the resulting telephone service may be destructively impaired. This result is so usual that it may be said to be inherent in long parallels of fairly high voltage power and single-wire telephone lines.

What is the remedy? Clearly not to exclude the power line from nor to hamper its occupancy of the highway. That would deny progress. It would contravene the public policy expressed by the permission given the power line to occupy the street. While telephone companies, because of the relatively cheap construction and low power requirements, have extended their service more rapidly than the power companies, using power plants of large capacity and expensive transmission and service lines, this affords no measure of the relative value to the public or the present or future demand for power and telephone service. Power is the essential requisite to modern development. It is most readily transmitted and supplied where needed in electric current. In recognition of this fact the public has opened the highways to electric power lines, and power companies are rapidly extending their service throughout the country. Very soon an arterial highway unoccupied by a power line will be an exceptional condition in this country.

INDUCTIVE INTERFERENCE AND ITS REMEDY

Of course, the recognized remedy for inductive interference such as above referred to is to make metallic the telephone circuit and co-ordinately transpose the lines. This is the general telephone line construction in urban streets, in toll lines and wherever signal lines are placed in streets occupied by power lines. It is the standard construction for jointly occupied highways. It is the type of line adapted to such joint use, to the existing condition. But the two-wire line is more expensive than the single-wire line, the increased cost becomes a burden on a rural telephone line and its users; and if we assume that the increased efficiency of the line is of no value to the users, it is an uncompensated burden. Even so, it is difficult to see how the prior sole occupancy of the highway by the telephone company affects the present joint occupancy and the mutual rights and duties of the utilities. The prior occupancy simply permitted the telephone company to use the less expensive construction for a time. The change and resulting injury are not due to any failure of duty of the power utility, but to the growing public need and varied use of the highway to satisfy that need. For an injury so caused there is no redress.

A similar question arises as to single-wire, ground-return power lines supplying users along highways. Conductive interference with a grounded telephone line in the same highway will result. But if the telephone line is metallicized this conductive interference becomes unimportant. Whether there is inherently from such a supply wire inductive interference is a matter on which experts will differ. But a supply company cannot as a rule before a court sustain the position that the signal company should metallicize its line to avoid interference, and the power company should be allowed to continue a grounded service line. The supply company must do its full part to harmonize the methods of joint use of the highway. It must bear the uncompensated burden of putting its own line in highest modern standard condition. It must do this to avoid the charge that it is attempting to monopolize the highway through comparative immunity from extraneous interferences.

INJURIES OF TWO KINDS

There are two kinds of injuries which utilities as well as individuals suffer. One arises from the violation of some duty. Such injuries may usually be prevented by injunction and must be compensated for by damages in a proper action. Another class of injuries arises without any wrongful act but through a change in furtherance of the public welfare. For such injuries there is no redress. They cannot be prevented by injunction. For them no damages may be recovered. The existence for centuries of the legal phrase *damnum absque injuria*, which describes such injuries—injuries without recoverable damages—indicates that they always have been and always will be encountered. Progress cannot be stopped by private interests, and no damages can be recovered because of interference incident to such progress.

Mutual rights and duties in the highway may be divided into two classes or groups. As to certain practices and situations the rights and duties are absolute, based on well-defined, clearly established legal considerations. As to other practices and situations the rights and duties are not fixed. They depend upon mutual agreement and voluntary adjustment. They rest solely on considerations of helpful co-operation and the avoidance of controversies. In each of these classes the same rule is applicable, but on entirely different principles. The one rests on legal right, the other on moral right. An important duty in the first class is the obligation of every utility to maintain a modern system in proper repair, a system suitable for a jointly used highway. This is an absolute duty. It applies alike to supply and signal lines. A utility is legally responsible for failure to perform this duty. If such failure injures another utility, the offending party may be enjoined from such use of the street or be compelled to pay compensating damages. If such failure destroys the usefulness of the offending utility, it has no redress except to change its method of use of the street, and the burden of this change it must itself bear. The second class embraces the duty to co-operate in such matters as the location of lines in the highway, co-ordinating transpositions and joint use of poles. This is a moral duty. For a failure to perform there is no legal liability. For such failure the utility suffers principally through resulting controversies and retaliatory interferences. If adjustments are not voluntarily made by the utilities so as to give the public the fullest service with the least interference with other uses of the highway, legislation or commission rules will compel co-operative practices. Even on private rights of way railroad companies are thus compelled to permit track crossings and use of terminal facilities by other railroads. Street-car companies are frequently compelled to permit the movement into the city of suburban cars over their lines.

The appointment of a joint general committee to consider and report on co-operative measures for supply and signal utilities which will further co-ordination and prevent unnecessary interferences in highways shows that this association and the participating signal

utility appreciate that they have mutual duties as well as rights in the highways, and that a common understanding and declaration of those rights and duties and proper practices thereunder are essential to a free and harmonious use of the highway.

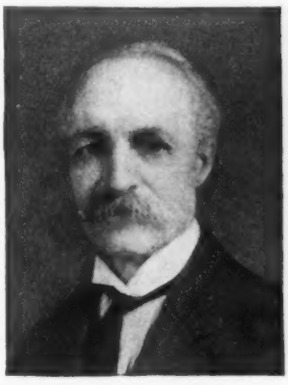
Certainly the utilities are more able, with their expert knowledge, to devise a just code of practices in highways than is any public body. It should be continually borne in mind in framing such a code of practices that the highway is public and that its use is permitted solely to give to the public the broadest possible service.

Interconnection and Service to the Farm*

State Lines Should Interpose No Obstacle to the Extension of Interconnection for the Good of All—In Regulated Private Industry with Pooling of Power for Large-Area Use Lies the Hope of Rural Electric Service

By Hon. Gifford Pinchot

Governor of Pennsylvania



HON. GIFFORD PINCHOT

YOUR great industry is still in the full flush of youthful strength. The rapid progress of invention and organization has enabled you to make this great expansion of business without so large an increase of cost to the purchasers of your output as has taken place generally with respect to the other commodities and services. This is a wonderful record in which you have a right to take pride. It has called for the investment of great sums in the securities of your companies, which have reflected your general prosperity by great stability in comparison with most other securities.

I count among the significant achievements of your industry your general acceptance of the principle of public utility regulation embodied in the laws of most of our states. To the establishment of this principle must be attributed a part of the stability of your securities. You have also generally accepted the beneficent principles of the federal water-power act and are undertaking development under it in unprecedented volume.

I am glad to make acknowledgment here of the frankness and fairness with which the representatives of the power companies operating and planning construction in Pennsylvania negotiated with the representatives of the Pennsylvania state administration last winter about the formulation of the two acts of June 14, 1923. These statutes embody in the law of Pennsylvania the principles of the federal water-power act as to water-power development and extend these principles to water development for steam raising and steam condensation in electric public service.

The future of electricity is far greater than its past. We stand at the beginning of an economic revolution that will be brought about by universal electric service made possible by long-distance electric transmission. The application of mechanical power to manufacture and to land transportation, together with the opening up a vast wealth of virgin natural resources due chiefly to these inventions, was the fundamental cause of the economic and social revolution witnessed by the nineteenth century. Watt's invention drew independent workmen to the steam engine and compelled them to work near it in masses under discipline. The products of the great new mill towns were carried to all the world by Stephenson's invention, and vast new cities grew up as centers of distribution. The inventions which you are now applying have made it possible to reverse this process. Instead of herding the workmen about the power plant you are bringing the power to the workman.

You are beginning to do for power what the railroad did for goods—to bring standard quantities and qualities of it to every man's door at standard prices. This is a new thing in the world—the most significant thing that is happening in the production and distribution of goods. The nineteenth century saw the centralization of industry on a vast scale, a decline in country life, the decay of many small communities, the weakening of family ties. The age of electricity may bring about decentralization of industry, the restoration of country life and the strengthening of small communities and of the family. My satisfaction in your past achievements yields to my hope for the future that universal electric service makes possible. I say "makes possible." It is the business of all of us to make it certain so far as that can be done.

No such profound change in economic life is possible without profound changes in law and government. It is the part of statesmanship by foresight to make these changes easy instead of obstructing them by blind conservatism. Many of the mistakes and blunders on the part of government and on the part of managers which were committed in the early days of the railroad era, beginning nearly one hundred years ago, are now clear. We should see to it that like blunders do not pervert the possibilities and disappoint the hopes with which we are beginning the era of electricity.

When we speak of giant power development we have

*Address made before the annual convention of the National Electric Light Association at Atlantic City, N. J., May 21, 1924.

in view eight specific objects which distinguish it from what was called superpower a few years ago. They are: (1) Large-sized stations, say not smaller than 650,000 hp.; (2) these stations will be at or near the mines and will supply energy to (3) a trunk system of transmission lines reaching 220,000 volts; (4) an integrated transmission and distribution system; (5) by-product recovery in some form; (6) furnishing electricity to the rural population; (7) trunk-line railroad electrification, and (8) a radical reduction in rates, especially to the smaller consumer and at least in proportion to the reduction in costs.

You will observe that the first five of these are means and the last three are ends that we have in view. Perhaps the most important of the means to these ends is the third I have mentioned, namely, the integrated transmission and distribution system. Separate high-voltage transmission lines restricted to the relatively small exclusive territory of distribution assigned to the companies owning these lines respectively will not suffice. Neither will the mere interconnection of such territories of distribution unless the connection is a true integration.

The ultimate system which we should have in view is a common reservoir of power for a territory limited only by practicable high-voltage transmission distance, into which power from nearly every source will be poured and from which power for nearly every use will be drawn. I do not need to point out to you the economies that may be expected from such a system; the leaders of your industry have pointed them out to me.

State Lines Do Not Count

One of the steps needed to create this universal pool of power is an integration of steam-power and water-power development. Although our water-power resources in Pennsylvania are relatively small—perhaps because of that fact—their development is becoming the most intensive that exists anywhere within my knowledge. We have great and we believe legitimate interest in those of our neighboring states, especially the power of Niagara and the St. Lawrence River. As I have said on another occasion, the freedom of commerce among the several states, the unrestricted exchange across state lines of services, goods and resources guaranteed by the federal constitution, is the strongest man-made basis of the prosperity of each state. This consideration applies not only to energy riding in a coal car, but equally to energy flowing over a wire, whether the burning of fuel or the falling of water was the source. Furthermore, really cheap power cannot be supplied to consumers unless the burning coal and the flowing water contribute their energy to a common reservoir for the common supply of industries, farms, homes and railroads.

Such a system must transcend state lines and is likely to become nation-wide. The new art of electric transmission is already so developed that the giant power system with which we are immediately concerned should already plan to include all power producers and consumers in the northeastern section of the United States and should perhaps draw also upon resources of water power in Canada.

The necessity for harmony of water-power legislation and administration among neighboring states is clearly brought out by the case of the Delaware River. The three states of Pennsylvania, New York and New Jersey have enacted legislation looking to the negotiation of a permanent compact which I hope will make certain the necessary harmony between these states with respect to that stream.

The Answer to Henry Ford

The giant power idea has in it special possibilities beyond the present vision of the best of us. But it has also immediate uses of a most practical kind. For example, it supplies the answer—the complete and final answer—to Henry Ford's attempt to get away with Muscle Shoals. The whole coastal plain of our Southern Atlantic States from North Carolina clear around to Louisiana and Texas is without large-scale electric service. To that service Muscle Shoals is the key. The thing to do with this second greatest water power in the United States is to find out, first, what it can be made to yield for the advancement of the whole South, and having found out just what we want, then and not until then proceed to consider just how best to get it. One thing we know, that to permit Henry Ford or any other man or set of men to use the power of Muscle Shoals mainly to build a single industrial city would amount to industrial and agricultural suicide for the South.

After what I have said, it is clear that the public has an interest in your business greater that in that of any other private investor. You are, in fact, public agents, and we frankly recognize and act upon that fact. Such relationship gives to you great privileges and imposes upon you great duties. One of them has not, I think, received the attention that it deserves. I refer to the fact that as agents of the people, doing public business, your duty and your interest alike require that you report upon your business in terms that can be understood by your principal, that is, by the people at large. One of the best means that I can suggest to this end is the simplification of your rate schedules to such terms that the ordinary man who desires to examine them carefully can in a brief time understand them and the relation of one rate to another. I believe that this practice would remove a serious cause of friction and distrust.

I have dealt at such length with means and methods that I have no time to speak of ends. But I cannot close without making special mention of one of our chief ends in view—the supply of electric service to the farms. They were, in large measure, excluded from the benefits of the economic revolution wrought by steam. Neither the farmers' productive power nor his comforts and conveniences of life were increased in proportion with those of other workers and investors. He was isolated, and a decay of rural life was the natural result.

This condition has been in part bettered by the gasoline engine, tractor and automobile—that is, by the application to his business of fuel power in small units. But, valuable as these agencies are, only electric service can put the farmer on an equality with the townsman and preserve the farm as the nursery of men and leaders of men that it has been in our past history. Therefore we have made this one of our chief objects. The Giant Power Survey and the Public Service Commission are studying it. I am glad to note that the leaders of your industry are also studying it, and I am confident that we shall find a way to bring it about.

Digest of Electrical Literature

Including Brief Abstracts of and References to
Important Articles Appearing in the Scientific and Engineering Press
from All Parts of the World

Photostat copies or English translations of complete articles will be furnished at cost upon request

Hydro-Electric Development and Steam Equipment

Electric-Steam Boiler.—W. PFISTER.—A large paper mill near a main transforming station of a Swiss hydro-electric power plant took advantage of a very reasonable power rate at which it was offered surplus energy during the summer months and installed, as an addition to its existing coal-fired boilers, one 4,000-kw., three-electrode-type electric boiler. Three-phase, 50-cycle current at 10,000 volts is furnished, which is utilized directly in the boiler. The economic capacity limits for the generation of steam with this boiler are a minimum of 700 kw. and a maximum of 5,000 kw. The over-all dimensions are 70-in. diameter and 10-ft. height, and its working pressure is 12 atmospheres. About 10,000 lb. of steam can be produced per hour. The steam output of the boiler is regulated by moving insulating cylinders over its three electrodes, thus changing the internal resistance and consequently the current consumption. An extra set of electrodes is available for replacing those in the boiler in case of trouble. Starting with cold water in the boiler, the full pressure of 12 atmospheres can be reached within twenty-five minutes. The boiler operates with an efficiency of 95 per cent, as compared with 70 per cent of the coal-fired boilers of the paper mill. During five and one-half months last summer 12,000,000 kw.-hr. was consumed in the boiler, which, it is asserted, saved the mill about 2,000 short tons of coal.—*Schweizerische Wasserwirtschaft*, March 25, 1924.

Saxton Plant of the Penn Central Light & Power Company.—A. IDDLES.—This station for ultimately developing from 80,000 kw. to 100,000 kw. is built at the mouth of a mine. The first section of the plant contains two 10,000-kw. steam turbo-generators with boilers equipped with economizers. The method by which the load on the house turbine is automatically controlled by the temperature of the boiler-feed water is of particular interest.—*Power*, April 15, 1924.

Latest Developments of Water Turbines.—C. SCHMITTHENNER and H. MUNDING.—The lapsing of water-turbine development in Germany during the war has been followed by very rapid strides since. Some of the most noteworthy waterwheels for low and medium head designed and installed during the last five years are described in separate papers by the respective authors named above. The authors deal with Francis turbines with vertical and horizontal axes, of the single and twin type, and with speeds suitable for geared or direct drive of generators. The largest among these is a twin wheel designed for an average head of 36 ft. and a water consumption of 90 cu.m. per second, delivering 12,000 hp. at 107 r.p.m. Of particular interest are a number of Kaplan open-vane type turbines with stationary and adjustable propellers, which show a very high efficiency at fractional loads. The papers contain sixty illustrations, including forty sectional drawings of waterwheels.—*Zeitschrift des Vereines Deutscher Ingenieure*, April 12, 1924.

Condensing Equipment for Isolated Plants.—C. L. HUBBARD.—Types of condensers suitable for this type of service and the calculations involved in determining capacity and water requirements are reviewed. Among the jet condensers considered are the parallel-current and counter-current types, while under service condensers the water-cooled, air-cooled and evaporative types are considered.—*National Engineer*, April, 1924.

Transmission, Substations and Distribution

Cementing of Porcelain Insulators.—E. ROSENTHAL.—Much trouble has been experienced in the past on high-voltage insulators assembled by cementing the individual pieces together. The cement expands in setting and causes cracking of the porcelain, which in many cases does not appear until two or three years after the cementing. At first it was attempted to shape the porcelain parts so as to minimize the pressure exerted, but the results were unsatisfactory. A cementing material has been found which does not expand in setting and which is, after an accelerated setting process, non-porous. A mixture of portland cement and a low melting-point pitch are the two chief components of this cement. After assembly of the complete insulator it is heated for a certain period to 90 deg. C., which accelerates and accomplishes the setting. The temperature is then raised to a point where the pitch melts, filling all pores and rendering the cement impervious to water from the atmosphere. A large number of practical tests have demonstrated that insulators cemented in this way are mechanically stronger than those cemented in accordance with older methods and that no "driving" of the cement during setting or later due to the absorption of water can be observed.—*Elektrotechnische Zeitschrift*, April 10, 1924.

Automatic Substations for Industrial Plants.—CHESTER LICHTENBERG.—Industrial enterprises are now taking advantage of the development in automatic substation equipment. In this article the author describes the principal types of electric power transforming equipment to which automatic switching has been applied. The automatic control of synchronous condensers, motor-generators, converters, hydro-electric generators and feeders is treated in such a manner as to furnish industrial engineers with data upon which to base the designs of automatic stations for factories, mills, mines, shops and other kinds of industrial plants.—*Journal of A. I. E. E.*, May, 1924.

Generation, Control, Switching and Protection

Forced Oil Cooling for Transformers.—A cooler for large transformers is described which resembles a surface condenser as used on steam turbines. A large number of small tubes are stacked in a circular bundle, which is lodged within a cylindrical cast-iron shell. The hot oil from the transformer is pumped through this shell and comes in intimate contact with the surface of all the tubes. If water is available, it is forced through the small tubes by another centrifugal pump, thus causing water cooling of the oil. In localities where water is unobtainable or too expensive, or on transformers for electric locomotives, a large electrically driven fan forces air through the small tubes, in which case the apparatus serves as air cooler for the transformer oil. In a number of curves the relation between oil temperature, water consumption and air consumption is shown.—*Bulletin Oerlikon*, January, 1924.

Theory of Three-Circuit Transformers.—A. BOYAJIAN.—The characteristics of the three-circuit transformer, the literature of which is very meager, are discussed here in considerable detail. Some of the features of the scheme of treatment are as follows: Scope and general aspects of problems, peculiar phenomena of theoretical interest, equivalent electrical network that is useful in visualizing the problem and formulas for calculating regulation, revision of load and the equivalent effective impedance of short circuits, etc.—*Journal of A. I. E. E.*, April, 1924.

Power-Plant Design and Operating Costs.—The second article on the comparison of costs which enter into power-plant design and maintenance when various prime movers are used. In this article the prime movers considered are those that operate non-condensing and which will use superheated steam. The cost figures are based on a plant of 1,500 kw. rating.—*Power Plant Engineering*, April 15, 1924.

Units, Measurements and Instruments

Measuring the Reactive Component.—J. AUCHINCLOSS.—For determining the causes of poor power factors some suitable device is essential to furnish a direct reading of the effect of changes made and to assist in maintaining a high standard. Among these devices is a power-factor indicator, reactive volt-ampere indicator and others. The theory and operation of the reactive volt-ampere measuring devices are minutely explained by the author.—*General Electric Review*, April, 1924.

Contact Resistance.—W. SCHÄLCHLIN.—A relation is derived between the contact resistance and the contact pressure for various metals, and the

results are given in curves in ohms per pound. Permanent or bolted contacts and movable or switch contacts are investigated. The data for the latter are of particular interest because they give valuable hints for the proper design of switches. The use of different metals for contacts and contact figures, such as, for example, copper upon brass, is no remedy for the fusing of the contact. Copper upon copper gives the best performance.—*Bulletin de l'Association Suisse des Electriciens*, March, 1924.

Measurement of Low Resistance by Means of the Wheatstone Bridge.—F. WENNER and A. SMITH.—In the procedure proposed the current terminals serve for connecting the resistance into the bridge circuit while the potential terminals serve as branch points. This puts the connecting resistances into arms adjacent to the arm containing the unknown resistance. Therefore their effect is made smaller than for the usual arrangement by the ratio of the unknown resistance to the resistance of the adjacent arms. In cases where the errors still caused by the connecting resistances need be considered two supplementary measurements with the same apparatus may be made practically to eliminate them. With a recently calibrated bridge a resistance of the order of 0.001 ohm was measured to an accuracy of 0.6 per cent directly and 0.03 per cent after applying the correction obtained by the supplementary measurement. The values of the resistances are obtained from the data for the most part by addition and subtraction rather than by multiplication and division.—*Scientific Paper, No.* 481, *Bureau of Standards.*

Heat Applications and Material Handling

Electromechanical Welding Machinery.—A. NEUBURGER.—In this descriptive paper the author illustrates the latest developments of a great variety of electric welding machines of the resistance welding principle. Machines are shown to produce spot welds, seam welds, butt welds, automatic chain welders, electric forges and rivet heaters. Valuable curve sheets are given from which energy and time required for welding various thicknesses of steel sheet and iron rods may be obtained for spot welding, seam welding and butt welding, all gathered from practical experience. Finally a universal welding machine, suitable for spot, butt, and arc welding, is described. This machine lends itself to a great variety of jobs in any repair shop. The paper contains twenty illustrations of the latest types of these machines.—*Elektrotechnik und Maschinenbau*, April 6 and 13, 1924.

High-Carbon Welding Metal.—C. A. MCCUNE.—The maintenance and reclaiming of high-carbon steel parts by the welding process, particularly where it involves the building up of worn surfaces subjected to abrasive wear, is the field where most high-carbon welding is at present applied. The author presents results of experiments in this field. He deals particularly with methods by which the welded section is made to be of the same hardness as the rest of the material.—*Journal of the American Welding Society*, March, 1924.

Electric Passenger Lifts.—H. MARRYAT.—A number of problems on the design of lift elevators and that require investigation are referred to. The methods employed in calculating the lift capacity required in a building are outlined. A plea is advanced for the employment in England of lifts of higher running speed and improved acceleration, and a method developed by the author and adapted for investigating acceleration problems is described. A comparison is made between drum and sheave driving. Micro-drive and decelerator devices for attaining automatic floor leveling are detailed.—*Journal of the Institution of Electrical Engineers* (*England*), April, 1924.

Motors and Control

High-Speed Direct-Current Motors.—E. KLINGENFUSS.—For the direct drive of low-pressure air blowers as auxiliary machines of Diesel engines on motor ships very high-speed direct-current motors, operating at 220 volts, ranging from 100 kw. to 500 kw. output, are used, and a description of them is contained in this paper. According to the size of the blower, motors of 5,500 r.p.m. to 3,500 r.p.m. are required. The rotor coils are securely held in the slots by wedges, and the coil heads are under very heavy wire bandages. A fan at each end forces cooling air through the rotor. Particular attention had to be given the commutator. Its segments are very long and are retained by three shrunk-on steel rings. Each segment has its own little fan blade so as to maintain a reliable surface cooling of the commutator. Commutating field poles and compound winding permit sparkless commutation at all loads with a permanent location of the brushes. Standardized, steel-inclosed starting and regulating panels for these motor drives are described, of which the type for restricted areas, as on U-boats, is of particular interest. — *Brown-Boveri Mitteilungen*, April, 1924.

Electrophysics, Electrochemistry and Batteries

Electrolytic Refining of Tin.—J. R. STACK.—Electrolytic refining of tin has been carried out on a large commercial scale at Perth Amboy, N. J., since 1916. Up to date the only practical solution of the problem of separating from tin impurities such as antimony, arsenic, lead and bismuth lies in electrolysis. The various electrolytes tried out commercially are discussed. The treatment of the anode slimes is also briefly described.—*Paper presented before the American Electrochemical Society, Philadelphia*, April 24-26, 1924.

Effect of Certain Impurities in Storage-Battery Electrolytes. — G. W. VINAL and F. W. ALTRUP.—A new method for measuring the rate of sulphation of storage-battery plates was recently devised at the Bureau of Standards (described in Technologic Paper No. 225). This method consists of periodic weighing of plates suspended in electrolyte. The present paper is an extension of this work, dealing in particular with the effect of detrimental impurities when present in electrolyte.—*Journal of A. I. E. E.*, April, 1924.

Traction

Passenger and Freight Locomotives for Mexican Railway Company.—G. H. WALKER.—The article deals primarily with a description of the mechanical and electrical details of locomotive design and shows how they have been arranged to meet the service requirements of this particular electrification. The locomotives are of 0-4-4-4-0 type with a horsepower of 2,736 and operate on 3,000 volts direct current.—*General Electric Review*, April, 1924.

Railroad Electrification.—A. H. ARMSTRONG.—The author points out that the electrification of steam railroads offers the most reasonable and tangible remedy for the cure of existing evils in long-haul transportation. In the first part of the article he points out that approximately $800,000,000 is needed for road and equipment each year. Of the money supplied in the past, 98 per cent has come from borrowing at rates above the rate of return that was earned. How this condition can be partly remedied by electrification of existing steam roads is the author's subject.—*Electric Traction*, April, 1924.

Telegraphy, Telephony, Radio and Signals

Power-Circuit Interference. — S. C. BARTHOLOMEW.—The greater telephone development and special conditions as regards transmission of electricity in the United States resulted in interference problems arising earlier and apparently more acutely in that country than in England. In England the trouble had been more in the nature of isolated incidents, and until recently there has been little distribution by overhead lines. In the introductory part of the paper the author deals briefly with the technical problem of telephony and gives definitions of various terms. He then goes on to consider audibility standards, transformer troubles, relation between power circuits, maintenance and adjacent telephone circuits, regulations that are now in effect and finally effects on telephony of single-phase traction.—*Electrician* (*England*), April 18, 1924.

Miscellaneous

Copper and Electricity.—N. R. STANSEL.—The author gives a very extensive account of the copper industry, touching on its many different phases, from the time the metal is mined until the final product.—*General Electric Review*, April, 1924.

Mica and Micanite Insulation.—A. A. C. DICKSON.—Varieties, properties, practical tests and choice of mica and the manufacture and test of commutator micanite are discussed.—*Electrical Review* (*England*), March 14, 1924.

News of the Industry

Chronicle of Important Events and General Activities, Announcements and Reports of Association Meetings, Court Decisions and Commission Rulings and News of Electrical Men

Effort to Report Ford Bill Out Fails

Committee Refuses to Bring It Before Senate Even with Unfavorable Report—Majority Thought to Favor Government Operation—Hearings Will Close Monday

BY A VOTE of ten to six, the Senate committee on agriculture on May 21 refused to allow the bill embodying Henry Ford's offer for the Muscle Shoals properties of the government to go on the Senate calendar, even with an unfavorable report. No motion proposing to report the Ford bill favorably was made at this session of the committee. Had such a motion been made, it probably would have been supported by not to exceed four votes. The objective of the proponents of the Ford bill at this hearing was to get the measure on the Senate calendar. They recognized that a favorable report could not be obtained, so the only motion made was the one to report the bill unfavorably.

After the failure to get the Ford bill out of committee even with an unfavorable report, it was moved to report Chairman Norris' government-control bill. This would have been of advantage to the Ford supporters, as the passage by the Senate of this substitute for the Ford bill would have thrown the legislation into conference. In this way many of the features of the Ford bill could be embodied in the conferees' bill. This proposal, however, was voted down, eleven to six. A motion to close the hearings immediately was lost overwhelmingly, but by a vote of ten to six the committee agreed to close the public hearings on May 26 and to consider, in executive session, on the day following such final action as the committee may take.

The majority of the committee, it is believed, feels that in view of the government's two-hundred-million-dollar investment at Muscle Shoals the best course is to pursue is government operation of the dam and its power house. In that connection it has been suggested that contracts for power, for a time at least, be for relatively short periods until actual operation may have demonstrated the terms and conditions under which the public will be served best.

Senator Heflin of Alabama declares that he will find a way to get a vote in the Senate on the Ford bill. He probably intends to propose it as a rider on some other bill.

Mr. Yates' Testimony

E. A. Yates, vice-president and general manager of the Alabama Power Company, who, as reported last week, appeared on behalf of the associated Southern power companies' bid, proved one of the most interesting witnesses to the committee members and was kept before them several days longer than he had expected. In reply to questions Mr. Yates asserted that the Southern power companies are not inimical to government control and operation of Muscle Shoals, but, on the contrary, viewed this suggestion, in the words of Mr. Yates, as "in some respects preferable to private operation." The power companies, Mr. Yates said, would offer to buy electricity from the government in such event and would distribute it over a superpower system. Mr. Yates further told the committee that the Alabama Power Company would be willing to sell to the government at a fair price the site necessary for the construction of Dam No. 3. He recalled that the company had sold the site for Dam No. 2 to the government for one dollar during the war. Unless the power from Muscle Shoals is distributed throughout the Southeastern States, Mr. Yates said, the shortage in that territory within fifteen years of development of use would be tremendous. He read from an article in the Electrical World a summary of estimated increases in uses of electricity.

In the Electrical World's report of Mr. Yates' testimony last week the estimated annual return to the government from the Southern power companies' offer over the fifty-year period was inadvertently printed as ten million dollars. It should, of course, have been two million dollars.

Lloyd Bid Explained

Further testimony was heard by the committee from Elon H. Hooker and A. H. Hooker in explanation of the Hooker-White-Atterbury bid, in elaboration of previous testimony. The Lloyd bid, referred to in the Electrical World for April 12, page 737, was explained by several witnesses, particularly by J. H. Levering, a consulting engineer of Washington. This bid provides for government ownership and private operation.

Dr. J. W. Torentine of the Bureau of Soils, Department of Agriculture, told the committee that cheap fertilizer can be produced at Muscle Shoals because of the production there of ammonia phosphate. Theodore Swann, president of the Federal Fertilizer Company, Birmingham, said that production of highly concentrated fertilizer at the plant would mean a great saving to the farmers on shipments of the product. B. C. Edgar, vice-president of the Tennessee Electric Power Company, which is associated in the power companies' offer, urged distribution of the electricity over the Southeastern States through a superpower system.

Colorado Springs Votes for Municipal Plant

After a vigorously waged contest which culminated in the heaviest vote ever cast in a special election involving a bond issue in Colorado Springs, that city voted on Tuesday of this week, May 20, to authorize an issue of $1,250,000 to erect, purchase or equip a municipal light and power plant. The vote stood: For the issue, 3,178; against the issue, 2,294, giving the issue a majority of 884.

Since the refusal of a new franchise to the Colorado Springs Light, Heat & Power Company, which has operated in Colorado Springs for a number of years, the fight has been a bitter one, and toward the end the municipal ownership issue itself was largely lost sight of, and it became more a question of politics and personalities. It is not yet determined whether the city will build its own plant or try to purchase that of the company.

Reported that Insull Interests May Buy Ontario Company

According to the Toronto *Financial Post*, the Insull interests of Chicago are negotiating to take over the properties of the Northern Canada Power Company, which is controlled by the David Fasken group in Toronto, Mr. Fasken being the company's president. It is quite possible, the Toronto paper says, that an early deal can be arranged for the change of control which would be followed by further expansion of the new group in the power field in northern Ontario.

The Northern Canada Power Company has for a number of years supplied power to gold mines in northern Ontario from plants of a capacity of 29,000 hp. It has recently been developing an additional 20,000 hp. on the Quinze River, utilizing the proceeds of a bond issue for $4,500,000 floated last spring. Further power resources of 40,000 hp. are controlled by the company. The *Financial Post* indulges in speculation as to a possible amalgamation of the Northern Canada Power Company's plants with a plant in the same district owned by the Hollinger Gold Mines, which have hitherto been unable to come to terms with the power company for industrial energy to operate their mines.

Thomas Commerford Martin Dies

Pioneer Member of the Electrical Profession Had Won Distinction as Editor, Writer and Secretary of the National Electric Light Association—Early Associate of Edison

JUST as the officials of the National Electric Light Association were putting the last touches to the arrangements for the Atlantic City convention of this week, word came last Saturday afternoon of the death of Thomas Commerford Martin, executive secretary of that organization from 1910 to 1919. Mr. Martin's health had not been good for several years, but his death, which followed an attack of pneumonia, came as a shock to the hundreds of electrical men throughout the nation who knew him personally. He died at the House of Mercy Hospital in Pittsfield, Mass. Besides his prominence for so long a period in the N. E. L. A., Mr. Martin had, as the editor of electrical journals for sixteen years, won wide distinction in the industry which grew from infancy to full vigor during the term of his editorship. He had been one of the first of Edison's associates and was the third and at the time of his death the oldest surviving president (in date of service) of the American Institute of Electrical Engineers. He was sixty-seven years old.

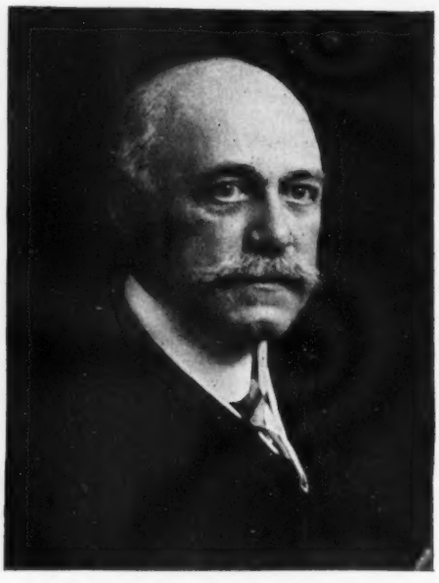
Mr. Martin's death imparted a note of sorrow to the proceedings of the N. E. L. A. convention, where a great many of his friends and acquaintances were numbered among the delegates. President W. H. Johnson, on behalf of that body, immediately sent a telegram of condolence to his widow expressing the "recognition and appreciation of a great industry for his years of devoted service to it," and adding: "Its record of progress and accomplishment was made luminous by his skill. For a quarter of a century his counsel and gifted pen were at its command. He contended valiantly and zealously for its ideals and was a great factor in its success. The entire electrical industry is his debtor and laments with us his passing." Appropriate resolutions were passed at the first general session on Tuesday morning.

The funeral was held on Tuesday afternoon, a special car leaving the Grand Central Station, New York, to convey mourners and friends to Woodlawn Cemetery, where the interment took place.

MR. MARTIN'S CAREER

Born in London, England, in 1856, and originally intended for the ministry, Mr. Martin came to America as a very young man and from 1877 to 1879 was associated with Thomas A. Edison in laboratory work and pioneer electrical development. In 1883 he became editor of the ELECTRICAL WORLD, a position he filled for seven years, when he resigned and took the editorship of the *Electrical Engineer*. In 1899, when the ELECTRICAL WORLD had passed under the control of the McGraw Publishing Company, which also purchased the *Electrical Engineer* and consolidated the two papers, he again became editor of the former, being associated in that capacity with the late W. D. Weaver. He retained this post until 1909.

A well-informed and industrious writer with a graceful style and more of literary technique than many engineering writers succeed in acquiring, Mr. Martin's journalistic work was a notable contribution to the progress of the industry on its less severely technical side and paved the way for his more permanent contributions to electrical literature. Notable among the latter are: "The Electric Motor and Its Applications" (1886), "Inventions, Researches and Writings of Nikola Tesla" (1893), "Edison—His Life and Inventions," in collaboration with Frank L. Dyer (1910), and "The Story of Electricity," in collaboration with Stephen L. Coles (1919). Mr. Martin also contributed articles on electrical topics to reference



THOMAS COMMERFORD MARTIN

books and periodicals other than the ELECTRICAL WORLD. His life of Edison had the unusual distinction of being translated into a Hindu tongue. As a speaker of much ability, Mr. Martin was also known on the lecture platform not only of America but of England and France. He was decorated by the French government as an officer of public instruction.

PAST-PRESIDENT OF A. I. E. E.

A charter member of the American Institute of Electrical Engineers, Mr. Martin became associate secretary of that body at its start in 1884, was made a manager in 1885 and elected president in 1887, afterward serving for two years as vice-president. He took a prominent part in raising the land and building fund from which sprang the present Engineering Societies Building in New York City and drew from Andrew Carnegie, whom he did much to interest in the plan, a public tribute to the "irrepressible and irresistible Martin."

For many years Mr. Martin served the United States Census Office as a special expert, gathering together comprehensive and useful statistics bearing upon the electrical and allied manufacturing industries. But his greatest work for the electrical body was done during his incumbency of the executive secretaryship of the National Electric Light Association. Here he became one of the leading authorities on central-station questions, and his "progress reports," made at the annual conventions, were awaited and studied with eagerness. On his retirement in 1919 he was made secretary emeritus of the association.

Mr. Martin was a past-president of the Engineers' Club, a member of the Institution of Electrical Engineers (Great Britain), the Illuminating Engineering Society, the Society for the Promotion of Engineering Education and the American Electrochemical Society. He was an active member of the Edison Pioneers, of which he had been vice-president. He was also prominently connected with the New York Electrical Society and was secretary of this body at the time of his death. A lover of his fellow men, a friend of intellectual and artistic progress, and social by instinct and training, he belonged besides to many organizations not of an engineering character. He was or had been a member of the New York Academy of Sciences, the Franklin Institute of Philadelphia, the Academy of Arts and Sciences, the Society for American Scenic and Historic Preservation and the National Civic Federation. He actively promoted and held office in many movements for public benefit both in America and abroad, especially during the time of the war, among them being the Marconi fund for Italian war relief and the Florence Nightingale Hospital for Training Nurses in France.

Large Rate Reduction in Boston in Prospect

The end of the long-drawn-out rate case of the Edison Electric Illuminating Company of Boston before the Massachusetts Department of Public Utilities is apparently in sight as a result of conferences held last week between the city authorities and President C. L. Edgar which indicated the early agreement of the parties in interest upon prices for residential and street-lighting service. To a representative of the ELECTRICAL WORLD President Edgar said that the proposals include (1) the establishment of street-lighting rates to yield the company about $100,000 per year more than the previous schedule and (2) graded reductions from the residential lighting rate of 9.5 cents per kilowatt-hour to a minimum of 8 cents by December 1, 1925, the initial change to be to 9 cents. It is estimated that rate reductions in the past three years have saved the company's residence customers more than one million dollars and that the reductions now contemplated will further reduce the price of such service to the consumer by at least one million dollars per year.

In the period from 1920 to 1923 the company's household rates were reduced by an aggregate of 19 per cent.

Nebraska Section of Age

Its Twenty-first Convention Deals with Public Relations, Rural Service and Better Home Lighting

THE organized electrical industry in Nebraska celebrated its twenty-first birthday when the annual convention of the Nebraska Section of the N. E. L. A. was held at Omaha on May 8 and 9, with a record attendance. President T. H. Fritts of Grand Island directed special attention to the purpose of the industry to bring electric service to the farms and to develop the best kind of home illumination.

The first half-day session was given over to a free-for-all discussion of public relations. It was not marked by theoretical papers or discussions, but was rather an experience meeting. The practical results of the information committee were discussed, and the women's committee work received most favorable consideration following a report by Miss Lucille Woodhall, chairman, and Miss Isabel Davie, divisional chairman.

Rufus E. Lee, president of the Continental Gas & Electric Corporation, discussed the progress of the past twenty years. He pointed out that under municipal ownership the capital invested in utilities as well as the value of the physical properties is removed from the tax rolls and an added burden of taxation is thus placed upon those, especially the farmers, who live beyond the service zone.

WATER POWER AN "IRIDESCENT DREAM"

Roy Page of the Nebraska Power Company was inclined to deprecate much of the talk on superpower. He thought that interconnection of present and prospective power sites would come as rapidly as proves economically expedient and that water power is an "iridescent dream" so far as Nebraska and many other prairie states are concerned.

Professor J. B. Davidson of the Iowa State College, Professor Hollister of the Engineering College of the University of Nebraska and President L. O. Ripley of the Middle West Geographic Division, N. E. L. A., discussed the rural electrification campaign optimistically.

A report from the committee on inductive co-ordination, of which A. J. Cole was chairman, showed much progress in arriving at amicable arrangements with the signal and communication companies. Chairman Roach of the merchandising committee made a report that involved a flood of questions and much discussion. He showed by a chart that saturation of electrical appliances results in a correspondingly high per capita consumption of energy.

"Illumination" was ably discussed by R. P. Burrows of the Western Electric Company, who was followed by Vice-president J. E. Davidson of the national body. Mr. Davidson explained the plans of the national campaign for better home lighting.

George A. Lee presided at the annual banquet, and L. O. Ripley, vice-president of the Kansas Gas & Electric Company, Wichita, and others spoke. Officers were elected as follows: President, A. J. Cole, McGraw Company, Omaha; vice-president, J. B. Hill, Lincoln Gas & Electric Company; secretary-treasurer, Horace M. Davis. The executive committee will comprise O. J. Shaw, Lincoln; George A. Lee, Omaha; W. P. Byron, Gothenburg; Burdette Boyes, Seward; G. K. Pittenger, Albion; T. H. Fritts, Grand Island, and J. E. Davidson, Omaha.

Osgood's Majority 271

Close Contest for Institute Presidency Arouses Much Interest—All Directors' Nominees Win

AS REPORTED in last week's issue, Farley Osgood has been elected president of the American Institute of Electrical Engineers by a small majority over Charles E. Skinner. The official count of the ballot, made public at the annual business meeting of the Institute on Friday evening, May 16, showed Mr. Osgood's majority to be 271, the vote standing: Osgood, 3,899; Skinner, 3,628.

Great interest was aroused among the membership in the close race, which was added to by rumors that some of the "directors' nominees" for vice-president had been defeated. The count, however, showed them all elected by good majorities. With 7,540 valid ballots cast, the vote for the directors' vice-presidential nominees was: H. B. Smith, district 1 (Northeastern), 6,687; L. F. Morehouse, district 3 (New York City), 6,480; Edward Bennett, district 5 (Great Lakes), 5,773; H. W. Eales, district 7 (Southwest), 5,902; John Harisberger, district 9 (Northwest), 7,061.

Directors' nominees for manager were also elected with the following votes: J. B. Whitehead, Baltimore, 6,651; E. B. Merriam, Schenectady, 6,201; J. M. Bryant, Austin, Tex., 5,562. George A. Hamilton, Elizabeth, N. J., was elected treasurer with a vote of 6,514.

The above officers together with the following hold-over officers will constitute the board of directors for the next administrative year, beginning August 1: Harris J. Ryan, Stanford University, Cal.; Frank B. Jewett, New York; J. E. Macdonald, Los Angeles; Herbert S. Sands, Denver; S. E. M. Henderson, Toronto; H. E. Bussey, Atlanta; William F. James, Philadelphia; R. B. Williamson, Milwaukee; A. G. Pierce, Pittsburgh; Harlan A. Pratt, Hoboken, N. J.; H. M. Hobart, Schenectady, N. Y.; Ernest Lunn, Chicago; G. L. Knight, Brooklyn, N. Y.; W. M. McConahey, Pittsburgh; W. K. Vanderpoel, Newark, N. J.; H. P. Charlesworth, New York.

At the meeting of the board of directors held on the same date F. L. Hutchinson was reappointed secretary.

The annual report of the board of directors, presented at the meeting, showed a net increase in the membership during the year of 1,157, the total membership on April 30 being 16,455. In addition to the four general conventions of the Institute there were 911 meetings held by the local organizations in the principal cities and educational institutions in the country, the aggregate attendance at these meetings exceeding 80,000.

Canadians Prepare Independent Electrical Code

To discuss plans for the formulation of a Canadian national electrical code, covering all electrical installations, a committee of the Canadian Engineering Standards Association met this week in Montreal at the Engineering Institute of Canada. The committee is formed of men representing the Canadian National Railway, the Canadian Pacific Railway, the Board of Railway Commissioners, the Canadian Fire Underwriters' Association, the Engineering Institute of Canada and other organizations interested in electrical installations. Every province was represented. F. A. Cambridge, city electrician of Winnipeg, Manitoba, acted as chairman.

Except in Ontario, electrical installations throughout Canada are now largely governed by the National Electrical Code of the United States. Because these rules are thought to deal inadequately with risk to life, many codes in Canada contain special added rules. In the case of the Hydro-Electric Power Commission of Ontario an entirely different arrangement of rules has been drawn up. This diversity of viewpoint has brought about much variation in local rulings, has put manufacturers to unnecessary expense and has led the Canadian Engineering Standards Association to initiate the present movement. It was decided to employ experts to draft a uniform code for the Dominion.

The committee also took up the question of inferior electrical material "dumped" on the Canadian market by the exporters of other countries.

Program of June Meeting of Northeastern A. I. E. E.

The two-day program of the first convention of the Northeastern Division of the A. I. E. E., to be held at the Polytechnic Institute, Worcester, Mass., on June 4 and 5, includes three excellent technical sessions besides a banquet at the Bancroft Hotel and inspection trips to plants of the New England Power Company, the Worcester Electric Light Company and industrial establishments. The excursions and recreational features will fill the afternoons. The program of papers follows:

WEDNESDAY, JUNE 4

Morning.—"New Type of High-Tension Network," Percy H. Thomas, consulting engineer; "Transformers for High-Voltage Testing," F. B. Cahall, General Electric Company; "An Efficient Tuned Radio-Frequency Transformer," Fred Drake and G. H. Browning, Harvard University.

Evening.—Banquet; "The Industrial Compass," N. F. Hanley, General Electric Company.

THURSDAY, JUNE 5

Morning.—"The Development of a Suspension-Type Insulator," Prof. H. B. Smith, Worcester Polytechnic Institute; "Thermotel," E. D. Treanor, General Electric Company; "Windmill Generator Plants," F. C. Doughman, Westinghouse Electric & Manufacturing Company.

Evening.—"Effects of Expansion and Contraction on Insulation of Long Armature Coils," T. S. Taylor, Westinghouse Electric & Manufacturing Company; "Short Circuits of Alternating-Current Generators," C. M. Laffoon, Westinghouse Electric & Manufacturing Company; "Torque Pulsations in Single-Phase Motors," P. L. Alger and A. L. Kimball, General Electric Company.

Columbia Dam Discussed

Power Men Hope to Build Priest Rapids Project Without Hurting Salmon

A DECLARATION by Henry J. O'Malley, head of the United States Bureau of Fisheries, that the federal government would be compelled to recognize the rights of the fishery interests as prior to the rights of the applicants for power was made at a public hearing in Seattle on May 14 held by the state fish commissions of Oregon and Washington to consider the application of the Washington Irrigation & Development Company for a permit to construct a dam across the Columbia River at Priest Rapids to be 90 ft. high. Mr. O'Malley told the power interests that the government would require them to prove conclusively that a fishway or fishways could be constructed that would permit salmon to pass over the big dam on their way to and from upper river spawning grounds before the Federal Power Commission would grant the license requested. He concluded his statement by asserting that up to this time, so far as the Bureau of Fisheries was informed, no fishway had been constructed that solved the problem of taking salmon over a dam more than 40 ft. high.

The fishery interests took the position that they had priority in the field by sixty years' record of operation, that the dam proposed by the power project would ruin the fisheries of the Columbia unless adequate provision was made for the salmon running up the river, and that the Columbia River yielded annually $25 a surface acre, the equivalent of good agricultural land. The annual value of the fish products of the Columbia was placed at $10,000,000. It was contended that the proposed dam would eliminate three-fifths of the spawning area of the Columbia and that it would be the forerunner of the ruin of the industry for the whole Northwest.

M. O. Leighton of Washington, D. C., an engineer in the employ of the Washington Irrigation & Development Company, has been working on the problem in connection with other engineers for several months, and he expressed the firm conviction that a practicable method will be worked out by which the salmon can negotiate the 90-ft. rise to be established by the big dam.

PRIEST RAPIDS PROJECT EXPLAINED

Henry J. Pierce of Seattle, president of the Washington Irrigation & Development Company, was questioned as to plans of his company, and made the statements that his company has been working on the Priest Rapids project for eighteen years, that it has purchased outright the 6,000 acres of land that will be flooded when the big dam is built, that it has also purchased 12,000 acres of land adjoining the rapids for a power site and the site for an industrial city to be built there, that the dam alone will cost $40,000,000 and will be the largest in the world, that the ultimate investment will be about $100,000,000, that it is planned to develop 400,000 hp. the year around and an additional 250,000 hp. during the spring, summer and fall months when the river is high, that this excess power will be used for irrigation purposes and that the company plans to sell for use in the manufacture of basic commodities only virtually all the primary power produced.

Mr. Pierce, when asked to reveal the ownership of his company, stated that it is virtually owned by the American Power & Light Company of New York.

Mr. Pierce said that the company is closing a contract with interests that will establish an aluminum plant to make 20,000 tons of aluminum a year from clay obtained in eastern Washington and that this concern will take 100,000 hp. yearly. He asserted further that power consumption for industries already arranged for would total 250,000 hp. His company, he said, recognized fully the rights of the fishery interests and was prepared to construct fishways whatever the cost.

At the close of the Priest Rapids hearing, Chairman Sims of the Washington State Fish and Game Commission was authorized to name a committee of five to carry on further negotiations with the power companies. This committee will consist of one representative each of Washington, Oregon, the federal government, the University of Washington and the fishing industry.

Another session was given over to a general discussion of the points of contact and possibly conflict of the two industries on all streams of Washington and Oregon where fish spawn and where power development has been found feasible. Among the power representatives present at the hearing were W. S. Shannon, Puget Sound Power & Light Company, Seattle; V. H. Grisser, Washington Water Power Company, Spokane; J. E. Yates, Pacific Power & Light Company, Portland, and O. B. Coldwell, Portland Railway, Light & Power Company.

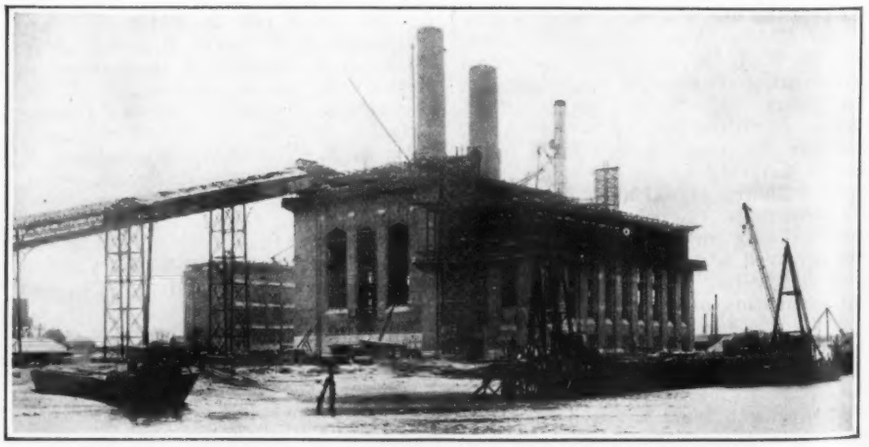
West New England Inspectors Meet at Pittsfield

Manufacturers and contractor-dealers met with the Western New England Association of Electrical Inspectors at Pittsfield, Mass., on May 14 and 15, to the total number of about 250.

Keen interest was evinced in a discussion on the question, "Should the circuit limitation be determined by the number of rooms, the square-foot area, cubic feet or wattage?" An informal vote showed that the old "six-sixty" ruling of the 1920 National Electrical Code was held inferior to the present one, adopted in 1923. Because of the impossibility of anticipating the amount of load which will be demanded of a given outlet, it was the sense of the meeting that none of the four factors mentioned could be correctly called determinative. The individual judgment of the contractor must be relied upon in each case, and public education on the dangers of overfusing must be pushed. It was resolved that the attention of the Associated Manufacturers of Electrical Supplies should be directed to the need of a fuse block which will not permit the use of a fuse greater than 15-amp. capacity. The ruling of the code in its present form on circuit limitation was approved.

A second discussion of considerable interest was aroused over the question, "Should the grounding of portable motors be required?" One recommendation was made that the frame of all portable motors used in wet places be grounded. It was pointed out by the chairman in this connection that the adoption of a three-wire conductor would certainly follow such a ruling, and that, while this might be ultimately advisable, it necessitates the education of the consumer on two points—grounded circuits and identified terminals—before any appreciable value would be obtained.

First Section of Weymouth Making Rapid Progress



VISUAL evidence that the new Weymouth station of the Edison Electric Illuminating Company of Boston is making good progress in construction is given by the above photograph, taken very recently. The initial boiler house and turbine hall will be expanded to five times the length shown when the plant is completed to its full rating of 300,000 kw. Two 32,000-kw. turbine units and four boilers will compose the first installation, and it is planned to place this section in operation next fall. This installation includes a 1,200-lb., 2,000-kw. turbine.

Other features of this interesting station were described in the ELECTRICAL WORLD for July 7, 1923, page 9.

Potomac Plant Favored

District of Columbia Committee of the House Is for Hydro-Electric Development at Great Falls

MUCH time during the consideration of the hydro-electric development of the Potomac at Great Falls has been taken up by the District of Columbia committee of the House of Representatives with abstract discussions of the relative merits of public and private ownership. A preponderance of the evidence is to the effect that the resources of the stream should be utilized. O. C. Merrill, the executive secretary of the Federal Power Commission, told the committee that it is wholly practicable to devise a plan which will be mutually advantageous to the Potomac Electric Power Company and to the public. The position of the local utility company, which has a large investment in a steam plant, is that it favors the development if a saving can be effected. Doubt is expressed, however, as to this being possible when it is considered that a very large steam capacity would have to be held as standby plant for use during the dry season.

Col. William Kelly, the chief engineer of the Federal Power Commission, pointed out that the development at Chain Bridge is especially attractive as a peak-power proposition. His revision of Major Tyler's estimate for the Chain Bridge portion of the development indicates that it now can be built at a cost 12 per cent less than the original figures. In that connection it is pointed out that Major Tyler, whose total figure was $44,421,000 (see ELECTRICAL WORLD, March 8, page 496), had instructions to be particularly liberal in figuring the costs so that the report could not be attacked on the ground that the estimates had been made purposely low to increase the chances of securing a federal appropriation for the purpose. Mr. Merrill, in his testimony, pointed out that a very material reduction could be made in Major Tyler's estimates by the revision of the interest and amortization items alone. In the view of costs at Muscle Shoals it is apparent also that the cost of concrete would be less than that estimated by Major Tyler.

COMMITTEE FAVORS DEVELOPMENT

Sentiment among the members of the committee is more favorable than ever before toward the development, although there is sharp difference of opinion as to whether it should be undertaken by the federal government or by private enterprise, prevailing opinion favoring the latter. Colonel Kelly testified that private interests are ready to undertake the work. He presented figures to the committee to show that the Washington-Baltimore area has at its command a smaller relative reserve power than any other one of nine areas in the northeastern part of the country.

At the request of the committee, the Attorney-General submitted an opinion that there would be no legal obstacle to the development of the project by the government. The government has a right, he pointed out, to condemn the land necessary for the purpose. Some fear had been expressed by advocates of the project that the ownership of riparian rights by the Potomac Electric Power Company might block any form of development which did not meet that company's approval.

Some opponents of public ownership see no objection to the development of this project by the federal government, owing to the fact that the government itself would be a large consumer of this power and because it has a peculiar interest in the utilities at the seat of government. A bill with this object has, as previously reported, passed the Senate.

Fortieth Anniversary of the Westinghouse Company

The fortieth anniversary of the active entrance of George Westinghouse into the field of electrical development on May 20, 1884, was fittingly celebrated by the Westinghouse Electric & Manufacturing Company on Tuesday of this week. The celebration took in part the form of short addresses on Westinghouse and the company he formed and on electrical progress. These were delivered by prominent officials of the company and broadcasted through the extensive radio stations owned and operated by it.

E. M. Herr, the president, talked from the station at Pittsburgh. General Guy E. Tripp, chairman of the board of directors, spoke at Springfield, Mass., addressing directly the Engineering Society of Western Massachusetts on "Some Political Aspects of Superpower Development" and making a vigorous attack on public ownership. C. A. Terry, vice-president, speaking from New York, had as his topic "The Personality of George Westinghouse." Guido Pantaleoni, talking from St. Louis, and another speaker, talking from Chicago, also took part.

The momentous service of the company in the development of alternating current, its pioneer work in the decorative illumination of the World's Fair at Chicago in 1893, its Niagara contract, its introduction of the steam turbine into America, its electrification of a section of the New York, New Haven & Hartford Railroad and its early exploitation of the radio field were among the outstanding achievements of the company dwelt upon by the "birthday" speakers.

Sees Large Field for Domestic Electric Refrigeration

Seventy per cent of the ice now manufactured is sold to comparatively small users who represent the potential market for the sale of electric domestic refrigerators, declared J. E. Starr, consulting refrigerating engineer, before a meeting of the New York Section of the American Society of Refrigerating Engineers on May 13. In the State of New York alone five million tons of ice are manufactured annually, and of this amount three and a half million tons are melted by the householder, who consumes from three to five tons of ice each year. This shows a possible total sale of between 700,000 and 1,000,000 machines within the state. Mr. Starr further pointed out that, taken the country over, only 30 per cent of the families use ice or refrigeration of any kind and urged both the ice manufacturers and the manufacturers of refrigerating equipment to increase their efforts toward educating the public in the sanitary and hygienic value of refrigeration.

Manufacturers of domestic equipment stated that their chief problems now are so to perfect their machines as to minimize servicing and to establish service schools for the instruction of dealers in making necessary repairs without having to call upon or wait for a factory engineer.

Miss Mary E. Pennington, refrigerating engineer, thought that the first cost of the domestic machines should, if possible, be reduced to meet more nearly the purse of the average householder. She also urged the need of more educational work and quoted statistics showing that in a Middle Western territory only 47 per cent of the people having telephones used refrigeration of any kind. Speaking from the housewife's viewpoint, Anna Pierce of the New York *Herald-Tribune* Institute said that women are already "sold" on the idea of electric refrigeration and the question of price is the chief consideration.

California Central Stations to Spend Over Fifty Millions

Expenditures for new construction by the electric utilities of California for the year 1924 will exceed fifty million dollars according to figures compiled by the Railroad Commission. The major items in this development program, conservatively estimated, are as follows:

Great Western Power Company of California	$2,652,000
Los Angeles Gas & Electric Corporation	3,000,000
Pacific Gas & Electric Company	15,000,000
San Diego Consolidated Gas & Electric Company	1,000,000
Southern California Edison Company	26,000,000
Western States Gas & Electric Company	1,000,000

One of the principal projects now under way in the state is the Pit River No. 3 hydro-electric development of the Pacific Gas & Electric Company. This will be completed during the summer of 1925 and will bring in an additional 100,000 hp. The Southern California Edison Company will expend over $10,000,000 on its Big Creek hydro-electric development this year alone. The Florence Lake tunnel will be completed at a cost of about $6,000,000, and in excess of $2,000,000 will be spent for an additional 25,000-kw. generator in each of power houses Nos. 1 and 2 on the Big Creek development. In addition to these hydro-electric projects the Southern California Edison Company will have three steam turbine-driven generators totaling 20,000 kw. in operation by July 1, 1924, and the Pacific Gas & Electric Company is installing a 15,000-kw. turbine at Sacramento which, it is announced, will be ready to go into operation in August.

Briefer News

Georgia Electrical Association.—The third annual meeting of the Georgia Electrical Association will be held at the Atlanta-Biltmore Hotel, Atlanta, on June 18 and 19. J. E. Mellett of the J. M. Clayton Company is president of this association and will be in active charge of the meeting.

Low-Speed Mine Locomotives Discussed Before Chicago A. I. E. E.—S. W. Farnham, Goodman Manufacturing Company, in comparing mine locomotives before a joint session of the Western Society of Engineers and Chicago Section, A. I. E. E., on May 12, favored the use of low-speed gathering locomotives because they require lower operating current and less generator capacity, give better control on grades and improve pulling strength, have lower rheostat capacity and show less wear and tear on equipment.

Electrification on Staten Island, N. Y.—The Staten Island Rapid Transit Railway Company, which serves Richmond Borough, New York City, will electrify its passenger service on the East Shore Division and the Perth Amboy Division as rapidly as plans can be developed and the work executed. This includes the lines between St. George, South Beach and Tottenville. The total track mileage which will be electrified at this time is approximately 40 miles. A nominal 600-volt direct-current third-rail system will be employed, and it is probable that electrical energy for multiple-unit operation will be purchased from the Staten Island Edison Corporation.

Canadian Electrical Association Convention.—Meeting at Ottawa on June 11, 12 and 13, the Canadian Electrical Association will, as usual carry through a complete program of committee and bureau reports. In addition the following papers are scheduled for presentation: "Industrial Heating," W. S. Scott, Westinghouse Electric & Manufacturing Company; "New Uses of Color in Merchandising," S. G. Hibben, New York; "Merchandising for Profit, Power and Peace," F. E. Watts, Cleveland, and "Distribution Systems," S. B. Hood, Minneapolis.

R. F. Schuchardt Meets C. D. Thompson in Public Ownership Debate.—A debate before the City Club of Chicago on "superpower" drew attention in that city last Saturday. Carl D. Thompson, secretary of the Public Ownership League of America, argued that the government should own and control the superpower systems and furnish service at cost. He was opposed by R. F. Schuchardt, electrical engineer of the Commonwealth Edison Company, who said public ownership advocates propose to turn the great electrical industry "into channels where progress is like the snail." No decision on the merits of the arguments was made at the meeting.

Great Western Completes Storage Dam.—The main section and spillway of the Butte Valley dam, in Plumas County, Cal., was recently completed by the Great Western Power Company of San Francisco. The dam, which is of the hydraulic-fill type, will increase the storage in Butte Valley from 5,000 acre-feet to 50,000 acre-feet, and will provide an additional water supply for the Caribou plant on the American River. An additional generating unit of 25,000 kw. capacity was placed in operation in this plant April 1, bringing the total capacity of the plant up to 72,000 kw. The water impounded by the new dam, with that stored in Lake Almonor, gives the company a total storage of 350,000 acre-feet in the two reservoirs for its two hydro-electric plants in this section. Lake Almonor is capable of an ultimate storage of 1,250,000 acre-feet, which will be developed as the demands for power increase on the Great Western system.

Coming Meetings of Electrical and Allied Societies

[A complete directory of electrical associations is published in the first issue of each volume. See January 5 issue, page 72, for latest list.]

American Society of Mechanical Engineers—Spring meeting, Cleveland, May 26-29. C. W. Rice, 29 West 39th St., New York.

Electric Power Club—Seaview Golf Club, Absecon, N. J., May 26-29. S. N. Clarkson, B. F. Keith Bldg., Cleveland.

Electrical Supply Jobbers' Association—Homestead Hotel, Hot Springs, Va., June 4-6. Franklin Overbagh, 411 South Clinton Street, Chicago.

Northeastern Division, A. I. E. E.—Polytechnic Institute, Worcester, Mass., June 5-6.

American Association of Engineers—San Francisco, June 11-13. C. E. Drayer, 63 East Adams St., Chicago.

Canadian Electric Association—Ottawa, Ont., June 11-13. Louis Kon, 311 Power Bldg., Montreal.

North Central Division, N. E. L. A.—Winona, Minn., June 11-13. H. E. Young, Minneapolis General Electric Company, Minneapolis.

Arkansas Utilities Association—Hotel Eastman, Hot Springs, Ark., June 12-14. R. I. Brown, Arkansas Central Power Company, Little Rock.

Associated Manufacturers of Electrical Supplies—Hotel Ambassador, Atlantic City, N. J., June 16-20. Frederic Nicholas, 30 East 42d St.

American Society of Civil Engineers—Pasadena, Cal., June 16-20.

Pacific Coast Electrical Association—Hotel Coronado, Coronado, Cal., June 17-20. S. H. Taylor, 527 Rialto Bldg., San Francisco.

Georgia Electrical Association—East Lake Country Club, Atlanta, June 18-19. W. C. Drake, 75 Marietta St., Atlanta.

American Society of Agricultural Engineers—Lincoln, Neb., June 18-20.

Empire State Gas and Electric Association—Commercial Section, Buffalo and Niagara Falls, June 19-20. C. H. B. Chapin, Grand Central Terminal, New York.

Wyoming Utilities Association—Casper, Wyo., June 23-24. H. C. Chappell, Natrona Power Company, Casper.

American Institute of Electrical Engineers—Annual convention, Edgewater Beach (Chicago), June 23-27. F. L. Hutchinson, 33 West 39th St., New York.

American Society for Testing Materials—Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., June 23-27.

Iowa Section, N. E. L. A.—Wahkonsa Hotel, Fort Dodge, June 24-26. M. G. Linn, Des Moines Electric Co., Des Moines.

Society for the Promotion of Engineering Education—University of Colorado, Boulder, Col., June 25-26. F. L. Bishop, University of Pittsburgh, Pittsburgh.

Northwest Electric Light and Power Association—Gearhart Hotel, Gearhart, Ore., June 25-27. G. H. Guefroy, Pacific Power & Light Company, Portland.

Ohio Electric Light Association—Hotel Breakers, Cedar Point, Ohio, July 8-11. D. L. Gaskill, Greenville, Ohio.

East Central Division, N. E. L. A.—Cedar Point, Ohio, July 9. L. B. Herrington, Kentucky Utilities Co., Louisville.

Boston Has Electric Truck School.—A successful electric truck school was held at the Rogers Building of the Massachusetts Institute of Technology, Boston, May 5 to 16 inclusive, under the auspices of the educational committee of the National Commercial Section, N. E. L. A. J. L. Faden, industrial engineer with the Boston Edison Company, was dean of the school, with Godfrey G. Kearful, Boston, as assistant dean. Lectures were given by H. S. Meese, Commercial Truck Company, Philadelphia; A. K. Brumbaugh, Autocar Company, Ardmore, Pa.; H. S. Baldwin, General Electric Company, Lynn, Mass.; Wiltin Bentley, K. W. Battery Company, New York; J. H. Tracey, Electric Storage Battery Company, Philadelphia; George H. Morris, Electric Storage Battery Company, New York, and A. E. Friedgen, Ward Motor Vehicle Company, Mount Vernon, N. Y.

New York Edison Stages Power Show.—A demonstration of the types of apparatus used in the construction of the vehicular tunnel under the North River was one of the exhibits at the power show held this week by the New York Edison Company. Included in the exhibit were an electric air compressor of the type used in the tunnel work, a shovel operated by compressed air instead of steam, hoists such as are used in bringing the tunnel muck to the surface and in lowering the materials used in construction, and ventilating apparatus. Other exhibits in the Power Show included electric refrigerating machinery, hoists, conveyors, tiering machines and other material-handling equipment, electric welders, drills and portable tools, exhaust fans and blowers and a residence oil-burning furnace. The exhibit was held in the Irving Place showroom of the company.

State-Wide Telephone Rate Fight on in New York.—The legal advisers of the cities of New York State were informed at a hearing before Attorney-General Sherman last week that the effort of the New York Telephone Company to revise its rates will affect every city, county and village throughout the state. The conference is said to have developed the fact that the effort of the telephone company to base its rates on present reproductive values will, if successful, result in an increase of more than 30 per cent in the rates up-state and of about 40 per cent in New York City. A state-wide effort to prevent this increase was resolved on, and the Attorney-General will represent all the cities of the state in the impending litigation.

Four Iowa Companies Are Merged.—Announcement is made of the purchase of the Consumers' Power Company of Osage, the People's Power Company of Readlyn and the Calmar Electric Company of Calmar by the Northeastern Iowa Power Company of Clermont. With the consolidations the Northwestern Iowa Company now supplies electricity in about seventy-five towns.

Electricity Aids Reopening of Abandoned Mines.—The new high-tension steel-tower line which is being built by the Pennsylvania Power & Light Company from its water-power plant at Hauto, Pa., to Frackville and points beyond is nearing completion. Among the industries it will serve are the Candlemas coal mines, near Silverbrook. These mines were abandoned twenty or more years ago, but recently have been reopened and seek electric power. A branch line will be built over a mountain to supply them.

Albany to Have Statue of Henry.—Following a conference with Dr. James M. Clark, director of the State Museum, Mayor William S. Hackett of Albany, N. Y., has announced that a committee will be named to raise a fund in that city for the erection of a statue to Joseph Henry. "Dr. Clark has already succeeded in raising $15,000 for this purpose," said Mayor Hackett. "As much more is needed." The committee will consist of Dr. Clark, Frederick Townsend, chairman of the board of governors of the Albany Academy, and former Governor Martin H. Glynn.

Pulverized Fuel in England and France. — George C. Usher, general manager of Vickers & International Combustion Engineering Corporation, Ltd., Great Britain, a member of an inspection party of prominent executives and engineers now touring the United States, asserted during a recent visit to the Lakeside plant of the Milwaukee Electric Railway & Light Company, one of the largest generating plants making use of pulverized fuel, that large schemes are on foot both in England and France to establish steam generating plants using this fuel. Some of the coal districts in England, Mr. Usher said, produce a coal that disintegrates to atmospheric conditions and obviously lends itself to pulverization.

Lakeside Station at Boulder, Col., to Be Opened in November.—The Lakeside steam plant of the Public Service Company of Colorado will not be placed in operation before November 1, according to recent announcements of the utility company. It was originally planned to place the plant, which is ultimately to cost $12,000,000, in operation about July 1 of this year, but delay in the arrival of machinery has held up the work so that it will not be possible to complete the project on the original date. The first unit, now under construction, will cost $4,000,000 and is to have a capacity of approximately 20,000 kw. The plant is at Boulder Lake, an artificial reservoir high in the mountains 4 miles east of Boulder.

How New Skyscrappers Add to Load of Metropolitan Central Stations.—An example of how the load of the central stations in the big cities of the country grows as more and more mammoth buildings are erected is afforded by the Lefcourt-Marlborough Building, which is rising on the site of the old Marlborough Hotel at Broadway and Thirty-sixth Street, New York, and is expected to be ready for occupancy next February. This building, which will be twenty-one stories high with a frontage of 167 ft. on Broadway and a depth of 159 ft., will be lighted by 14,000 electric lamps and will require about 750 hp. for the electric operation of its elevators, pumps and ventilating system. It will be supplied, like virtually all the big buildings erected in New York in recent years, from the lines of the New York Edison Company.

Scrapping a Stack Rendered Obsolete by Electricity.—The economy of electricity in the industrial field is proved when manufacturers introducing it are willing to scrap equipment formerly used that cost thousands of dollars to

install. The Rubel ice plant at Jamaica, N. Y., recently completed the installation of an electrical ice-manufacturing plant and scrapped its former equipment. The illustration (a New York *Herald-Tribune* photo) shows a concrete chimney 129 ft. high coming down. The base of the stack was cut away, the chimney being shored up with timber, to which fire was set. The electrical equipment for the Rubel plant was installed under the supervision of the engineering staff of the New York & Queens Electric Light & Power Company of Long Island City.

Walnuts Dried by Electric Heat.—An interesting application of industrial electrical heating has been made in the walnut industry in California. The usual practice is to place the nuts in large trays in the sun for curing. It requires from five to fifteen days properly to dry a tray full of nuts, depending upon the weather. A practicable method of artificial drying seems to have been found in the use of electric heat. Three installations of this nature were made during 1923 on different walnut farms. A connected load of 45 kw. on each drier is installed, giving a sufficient capacity to heat 4,000 cu.ft. of air a minute, raising the temperature 40 deg. F. Standard General Electric oven heaters are used, rated at 5 kw. The heaters are placed in a metal duct and a fan blows air across them and through the necessary ducts to the several bins containing the nuts. A thermostat maintains the temperature of the air at about 100 deg. F. Three General Electric control panels are used. Eight tons of nuts can be dried in this way in forty-eight hours, using four bins.

Electrifying Life-Saving Beacons.—The long life and sturdiness of the modern electric light, together with its brilliance and small cost of upkeep, is resulting in the gradual replacement with electric lamps of the oil lamps which have served for years to light the 5,800 shore beacons and buoys that warn ships of dangerous rocks and reefs along the coasts of the United States. A standard battery and electric lamp has been developed by the government that will last for one year, with a maintenance cost of $20, as compared with the $15 a month paid for the cleaning, filling and lighting of an oil lamp. One man in a small motorboat can care for a large number of these electric signals, whereas a lighthouse tender and crew were needed to carry stores of oil or acetylene for the earlier type of lights. Where regular attention cannot be given to an electric beacon, automatic equipment is used whereby a new lamp is snapped into position in the event of the failure of the first one, and "sun valves," which turn the electric light on and off according to the brilliance of the daylight, have been brought to dependability.

No Power Shortage in San Diego, Cal.—Although local business interests may have felt some apprehension during the past few months when the power situation was acute, there has been no time at which an adequate supply for San Diego and the territory supplied by the San Diego Consolidated Gas & Electric Company has been in question. This is not only because of the fact that all of the company's electrical energy is generated by steam, but also because of the recent installation of a 15,000-kw. steam turbine in the main steam plant in San Diego. In addition to supplying the needs of its own territory, the company has been furnishing as much power as the capacity of the frequency changers at Capistrano would permit to the Los Angeles territory. At the present time a transmission line between Escondido and Rincon is being rushed to completion, over which the Southern Sierras Power Company, operating in the Imperial Valley section, will take power. The San Diego Consolidated Gas & Electric Company has received a letter from the San Diego Chamber of Commerce commending it upon its ability to take care of the electric power requirements of the community as it has done.

Men of the Industry

Changes in Personnel
Accomplishments, Responsibilities, Honors, Appointments and Activities of Men Engaged in all Branches of the Electrical Industry

E. A. Young, who has been district manager of the Montpelier & Barre Light & Power Company in Barre, Vt., has been transferred to Montpelier in the capacity of investigator for the company.

Harry P. Simpson, manager of the publicity department of the Public Service Company of Northern Illinois, resigned on May 1. Mr. Simpson's ill health has necessitated his retiring from active business for an indefinite period.

S. E. Gates, local manager of the General Electric Company, Spokane, Wash., has been appointed manager of the Los Angeles office of the company. Mr. Gates has been in charge at Spokane for fourteen years and has been prominent in civic affairs, particularly in the activities of the Spokane Chamber of Commerce.

C. B. Stelle has assumed the duties of general superintendent of the Merchants' Heat & Light Company, Indianapolis. Mr. Stelle was connected with the company's electrical department four years ago.

A. J. Cole, since 1915 vice-president and general manager of the McGraw Company, jobbers of Omaha, Neb., was recently elected president of the Nebraska Section of the National Electric Light Association. Mr. Cole has been active on various N. E. L. A. local and Middle West committees and in the local electrical league.

William Elsdon-Dew, consulting electrical and mechanical engineer, Central Mining & Investment Corporation, Ltd., Johannesburg, Transvaal, South Africa, and local honorary secretary of the American Institute of Electrical Engineers, arrived in New York Thursday, May 15, for a visit of about two weeks before his departure for London.

Sherman S. Sharples, formerly connected with the Haverhill (Mass.) Electric Company, is now district manager of the Montpelier & Barre Light & Power Company in Barre, Vt., succeeding E. A. Young, recently transferred to Montpelier. Both these properties are under the management of Charles H. Tenney & Company.

J. A. Ward, formerly vice-president and general manager of the Huron (S. D.) Light & Power Company, has been appointed vice-president and general manager of all the South Dakota and Nebraska properties of the Albert Emanuel Company, Inc., New York, which recently took over the Huron company. Mr. Ward has had fifteen years' experience in the operation of public utility properties.

Jack Hobort, formerly superintendent of power for the Arkansas Central Power Company, Little Rock, for four years, is now at Helena, Ark., as superintendent of power for the Arkansas Utilities Company. Prior to his taking charge at Little Rock Mr. Hobort was division superintendent of the Fort Wayne & Northern Indiana Traction Company, Lafayette, Ind., where he had charge of the power plants, street railway and transmission systems, running into Delphi, Camden, Rockfield and Battle Ground.

R. J. Graf Is Appointed First Vice-President of Byllesby Company

Robert J. Graf, recently appointed first vice-president of the Byllesby interests, has been connected with that organization since it was founded in 1902. His entire business career has been in association with the late Colonel Byllesby. Mr. Graf was born in the District of Columbia November 13, 1881, and was educated in the common and preparatory schools there. When H. M. Byllesby & Company was formed in 1902 he became secretary and assistant treasurer. In June, 1914, he was elected vice-president. Mr. Graf is a member of the National Electric Light Association, the American Institute of Electrical Engineers and the Electric Club of Chicago.

R. J. GRAF

William Crooks, who has been chief engineer for the Arkansas Light & Power Company, Pine Bluff, is now devoting most of his time to the company he organized, the William Crooks Engineering Corporation, which has established offices in Little Rock, Ark. Mr. Crooks continues, however, as consulting engineer for the Arkansas Light & Power Company and other public service companies owned by the Couch interests.

W. T. Neill, rate engineer for the Pacific Power & Light Company and for the Portland Gas & Coke Company for the past three years, has been made superintendent of rates and service with jurisdiction over all matters pertaining to rates and their application as well as matters in connection with service-line extensions and allied activities. A specialist in utility rate and valuation problems for a number of years, Mr. Neill is eminently fitted for the position to which he has been appointed.

Walter D'Arcy Ryan, head of the General Electric Company's illuminating engineering laboratory, has received a grand prize for the electrical illumination of the Brazilian Centennial Exposition, held at Rio de Janeiro in 1922. To the General Electric Company of South America a similar prize has been awarded. The award carries with it a gold medal bearing the insignia of the exposition. The prize awarded to Mr. Ryan individually is in recognition of his work as director of illumination, particularly the effects he obtained with his "Novagem" jewels of various colors. Mr. Ryan also received a medal as chief collaborator with the General Electric Company of South America, while A. F. Dickerson, chief engineer of the laboratory, J. W. Gosling, decorative designer of the laboratory, and J. W. Shaffer, in charge of construction, received medals as fellow collaborators with Mr. Ryan.

Obituary

Lee Lobenthal, for the past twenty years manager of the Economical Electric Lamp Division of the National Lamp Works of the General Electric Company, died on Wednesday, May 14, at his home in New York City. Mr. Lobenthal was sixty-four years of age.

Frank C. Caldwell, a director of the Link-Belt Company since 1921, when that company purchased the H. W. Caldwell & Son Company, of which he was president, died suddenly on Thursday, May 15. Mr. Caldwell was a native of Indianapolis and was fifty-eight years of age.

Warren Young Soper, president of Ahearn & Soper, Ltd., electrical engineers and contractors of Ottawa, Ontario, died on Tuesday, May 13. Though a native of Oldtown, Me., Mr. Soper had been a resident of Ottawa nearly all his life. For a number of years before becoming head of Ahearn & Soper he had engaged in telegraphic work, which he discontinued in 1882. Mr. Soper, who was seventy years of age, had been identified with a number of utility companies in Canada.

John Hall McClement, formerly comptroller of the New York Edison Company, died suddenly on Friday, May 16, at his home in Brooklyn, N. Y. A native of Philadelphia, Mr. McClement became interested in electrical companies and railroads early in his career. He served as comptroller of the Northern Pacific Terminal Company at Portland, Ore., before affiliating himself with the Edison company. At the time of his death he was a director of the Allis-Chalmers Manufacturing Company, the Empire Engineering Company and of many other corporations. Mr. McClement was sixty-two years of age.

Commission Rulings

Utilities Not Obliged to Serve Unprofitably in Real Estate Development.—A franchise granting the right to furnish service within a stated territory must be reasonably construed, according to a decision made by the Board of Public Utility Commissioners of New Jersey in adjudicating a complaint brought by the borough of Bradley Beach against the Coast Gas Company. The commission said: "The borough contends that . . . the franchise requires the company to make extensions so as to enable it to furnish gas wherever called for. The company does not deny its duty as well as its right to furnish gas to proper applicants therefor, but claims that it is not in the business of developing or aiding in the development of real estate. . . . After consideration of the borough's claim that under the ordinance the company is obliged to extend its mains wherever required by the municipality to do so, the board is of the opinion that the ordinance in question must be reasonably interpreted. Under the interpretation urged by the borough, the company would be obliged to make any and all extensions called for, however unreasonable or unnecessary and although in possible conflict with the limitation in the statute and the authority of this board. The board cannot agree with this contention. No doubt the purpose of the ordinance was to secure service to the community when and where it might be reasonably required and in conformity with the law. The case will be disposed of upon this theory."

Nova Scotia Commission Favors Service Charge and Holds that Departments of Combined Utility Must Earn Their Own Return.—The Board of Public Utilities Commissioners of the Province of Nova Scotia, in fixing electric rates for the Nova Scotia Tramways & Power Company, serving the city of Halifax, followed established precedent by dividing the tariff into service charges and energy charges and by refusing to allow the company's three departments—railway, gas, and electric light and power—to be combined for rate purposes, insisting that each department must earn its own 8 per cent return. "One of the principal aims of those charged with the duty of rate making," said the commission, "is so to prepare the schedules as to distribute equitably both the overhead and the operating costs. Undoubtedly this can be more successfully done in the two-part schedule than in a schedule such as this company is operating under at present." For commercial lighting and power service the service charge is to be based on connected load or maximum demand, and for domestic service the floor area of the premises served is to be used as a basis for the charges. Reduced rates for off-peak energy are prescribed. The cut in rates made by the commission averaged about 9 per cent. The company now purchases energy from the provincial government's hydro-electric development on St. Margaret's Bay for 1.25 cents per kilowatt-hour as against a former cost for steam generation of 2.36 cents. It was permitted to retain all of its steam equipment as standby plant. The commission refused to make the new rates retroactive to June, 1922, when the hydro-electric energy was first purchased.

Standby Service Rate.—A standby service rate authorized in conjunction with a schedule of electric rates which contains no demand charge should be applied only where the customer normally furnishes his service by other means than a supply of energy from the utility, but wishes connection with the utility's lines in order to protect himself against breakage or shutdown, according to a decision of the Wisconsin Railroad Commission in a case affecting the Reedsburg municipal plant. The commission held that the standby rate should not be applied to part-time service, such as night use for lighting, for such use is regularly made of the energy furnished by the utility.

Recent Court Decisions

"Going Value" Must Be Considered in Fixing Rates.—Emphasizing the statement that the purpose of the Illinois Commerce Commission act and preceding acts is to maintain a general control over the operation of utility companies in the state to the extent of preventing them from exacting from their patrons unjust, unreasonable and discriminatory rates, and that only when a utility seeks to impose such rates can the commission prescribe others, the United States District Court for the Southern District of Illinois (in Streator Aqueduct Company vs. Smith) has upset rates fixed by the commission for water service, calling them confiscatory. The court's finding was based in part on the commission's treatment of "going value." "The going value," said the court, "is property which cannot be taken away except by due process of law, and it is such property as the plaintiff is entitled to the enjoyment thereof, and where it exists must be considered as one of the important elements in determining the reasonableness or the unreasonableness of a rate charged or which it is proposed to charge. (295 Fed. 385.)*

Where Utilities Own Poles Jointly They Are Jointly Liable for Damages for Negligent Upkeep.—In Murphy vs. Rochester Telephone Company the plaintiff asked damages because of injuries received when a pole on which he was working fell. This pole was jointly owned by the Rochester Gas & Electric Corporation, by which he was employed, and two telephone companies. The New York Supreme Court has upheld a verdict for the plaintiff, holding that while under the workmen's compensation law he could not sue his employer, he could sue any third party liable, that the joint owners of the pole were equally responsible for its proper erection and maintenance, that the man was not a licensee but an invitee as regarded his presence on the pole, and that, while it was his duty to make some inspection of the pole's safety before ascending it, he was not required to make a thorough inspection, that being the master's duty. (203 N. Y. S. 669.)

*The left-hand numbers refer to the volume and the right-hand numbers to the page of the National Reporter System.

Missouri Commission Has No Power to Determine Damages.—In State ex rel. Missouri Pacific Railroad Company vs. Public Service Commission the Supreme Court of Missouri, declaring that the commission cannot exercise judicial functions and that any statute authorizing it to make a finding on what was purely a claim for damages by a shipper is void whether the finding was to be final or merely prima facie evidence, reversed an order of the commission which by virtue of certain statutes sought to determine damages in the case at issue. (259 S.W. 445.)

Contract Must Affect Public Welfare Before It Can Be Abrogated Under Police Power.—A bill in equity was brought by the Attleboro Steam & Electric Company, a Massachusetts corporation, against the Narragansett Electric Lighting Company, a Rhode Island corporation, to enjoin the defendant from cutting off the plaintiff's supply of electrical energy so long as the plaintiff conforms to the terms of a written contract dated May 8, 1917, whereby the defendant undertook to sell and deliver to the plaintiff during a term of twenty years all the electrical energy to be supplied by the Attleboro company to its customers in Attleboro, Mass. The bill alleged that the plaintiff had no generating plant and was unable to obtain from any source other than the defendant any substantial supply of electrical energy, and that if the defendant's threat to cut off its supply were carried out, great injury to itself and its customers would result. (See ELECTRICAL WORLD, February 23, page 394.) The United States District Court for Rhode Island found for the plaintiff, asserting that before a contract fixing charges for electric power can be interfered with under the police power of the state it must appear that the contract does in some manner affect adversely the welfare of the public, and that it is the duty of a company seeking a change in rates to sustain the burden of proof that the increase is necessary in order to obtain a reasonable compensation for its service. A finding by the Public Utilities Commission that a single contract of a power company was for the time being unprofitable could not establish the fact that the public interest had been injuriously affected. Where a power company furnishing electrical energy to an electrical company furnishing power to customers in a city threatened to cut off the supply to coerce a yielding to an illegal demand for increased rates, the case was a proper one for equitable relief by injunction. (295 Fed. 895.)

Business Conditions

A Survey of Important Developments in the Electrical Market Including Data on Production, the Sales Outlook, Credits, Exports, the Metals and Other Conditions Affecting Cost, Supply and Demand

Business Is Good in the Industry

Canvass of Exhibits at N. E. L. A. Convention Feels Pulse of the Industry and Finds Confidence Strong—Buyers' Market, with Prices Level

BUSINESS is good in the electrical industry, and fundamental conditions are sound, in the opinion of the manufacturers exhibiting at the N. E. L. A. convention in Atlantic City this week. This condition, as reflected by the industry, was obtained by interviewing representative groups of the 135 exhibiting manufacturers. Seldom does such an opportunity present itself to talk to practically the entire industry and feel its pulse. A most interesting and encouraging note in the business situation was to be found in the fact that not a single manufacturer reported business as actually being poor, nor was such a sentiment even intimated. Conditions, however, were reported spotty, although aggregating a healthy volume. The general tone was that there is a tapering off of business, yet it has not fallen to a point where it can no longer be classed as good. No pessimism was expressed.

Manufacturers dealing almost exclusively with utility companies have reported better sales than others; also, the companies that are manufacturing appliances and other apparatus appealing to the general public are enjoying better business. Those manufacturers that depend for the majority of their sales on industrial companies have, of course, reported the largest falling off in business. But in several such cases it was noted that this business valley is being satisfactorily filled in with other apparatus for general sale, and such lines were being stressed by directing increased sales efforts toward them. The result has been that total sales of these manufacturers are better than they otherwise would have been in spite of the falling off in business generally reported. Typical cases show that this falling off has been largely from set schedules for the year, whereas the actual sales are practically equal to those of last year.

Little change is reported in the New England trade this week, and central-station purchasing of pole-line material is the most active note in the electrical market. In New York the general slowing down still prevails, except in the case of building material, which is showing a good movement. Poles and pole-line hardware are most active in the Southeast district, and building construction is well sustained in large volume. In the Middle West central-station buying is normal, general trade is considered as being erratic and active building is reported, although business in most instances is dull. Sales are good on the Pacific Coast, although the volume has decreased somewhat. A brisk trade is reported in window and industrial reflectors, which is filling in the valley caused by the reduction in the purchase of staple materials.

Almost all companies handling central-station equipment report total business to date this year greater than for the corresponding period last year, so that even though utility buying has shown some decrease in sales, the total volume of business transacted by these manufacturers should, at the end of the year, be better than in 1923.

The present market can be summed up as good, with deliveries satisfactory, prices level and competition keen. It is essentially a buyers' market with a healthy volume of business actually being transacted.

Good Demand for Fans, Including Heating and Ventilating Type

MANUFACTURERS report that jobbers have purchased a reasonable stock of fans, and a large movement of them from the jobbers' warehouses into the hands of the retailers has already occurred. This activity has not been confined to any particular type or class, although there has been a noticeably early demand for higher-priced types, the trend being strongly toward the purchase of oscillators. The outlook for the season appears to be quite favorable, for while weather conditions have an important bearing on sales in the North, the sustained volume of fan business, normally anticipated from the South is expected to develop strongly in view of the present conditions there.

Simplification of the various fan lines has been made by some manufacturers. For instance, in more than one case the manufacture of multiple-speed stationary fans has been discontinued, the stationary fans made being single-speed only. Prices are firm with no indications of price reductions during the season. Transportation conditions have seldom been so satisfactory and jobbers have been securing prompt deliveries. No shortages have so far been apparent, but an early opening of the season throughout the country might easily result in broken stocks both with manufacturers and jobbers.

Business in heating and ventilating fans has been very good up to the present time as it is controlled largely by the volume of building. Manufacturers report that maximum production on this type of equipment will be maintained until the heating season opens. To meet the demand, one company has increased its manufacturing facilities very considerably in the last year. The sales of electrical ventilating equipment for homes, offices, etc., have been in such considerable volume over all the country that additional manufacturing facilities were found necessary in another case. Prices are at the same level as they have been for about one and a half to two years, which is said to be about as low as can be expected for some time. Deliveries are very good and considerable business still remains on the books of various companies.

April Delinquent Electrical Accounts Lower than in 1923

THREE divisions of the five reporting to the National Electrical Credit Association on electrical delinquent accounts for April, 1924, showed a lower number of accounts than for 1923. The comparison for March and April, 1924,

DELINQUENT ACCOUNTS IN APRIL

Branch and Month	Number of Accounts Reported	Total Amount	Average Amount
Central Division:			
Mar., 1923	993	$130,571.90	$131.49
Mar., 1924	941	99,989.14	106.26
Apr., 1923	794	111,130.28	139.96
Apr., 1924	871	110,326.40	135.04
New York:			
Mar., 1923	584	73,655.00	126.00
Mar., 1924	445	68,022.00	153.00
Apr., 1923	422	63,771.00	151.00
Apr., 1924	471	64,648.00	138.00
Philadelphia:			
Mar., 1923	204	26,386.27	129.34
Mar., 1924	233	26,163.85	112.29
Apr., 1923	241	35,099.19	145.80
Apr., 1924	221	25,313.95	114.54
New England:			
Mar., 1923	60	4,782.71	79.71
Mar., 1924	46	4,708.60	102.36
Apr., 1923	44	7,979.04	181.34
Apr., 1924	35	4,442.94	126.94
Pacific Coast:			
Mar., 1923	8	7,522.26	156.92
Mar., 1924	12	1,175.31	97.94
Apr., 1923	39	8,444.75	216.53
Apr., 1924	31	3,869.93	124.84

indicates that April financing was easier. It is interesting to note that collections in New England are rapidly approaching the figure established on the Pacific Coast. For April, 1924, thirty-five delinquent accounts were reported by New England and thirty-one by the Pacific Coast.

All Non-Ferrous Metals Have Declined in Price—Market Weak

ALL the principal non-ferrous metals have declined in price both in London and New York during the past week with the exception of silver, which has moved to a new high for the year. The week has accordingly been a poor one. While the slowing down of business in general is directly responsible for the weaker tendency of the metals, the passage of the bonus bill by Congress has also contributed to the condition of the market.

Copper took a drop of nearly a quarter of a cent during the last week, and although inquiries have been numerous, sales have been light, as would naturally be expected in a declining market. Most of the sales made during the week have been at 12¾ cents per pound, although some lots on Thursday sold at 13 cents per pound, delivered. The American Smelting & Refining

Company reduced its official contract price of lead on Thursday, May 15, from 7.50 cents to 7.25 cents per pound, New York. The market has been very weak and inquiries have been chiefly for forward shipment. The zinc market has been very quiet. Galvanizers have largely stayed out of the market owing, it is believed, mainly to a falling off in their business. There have been virtually no new orders in the tin market. Prices have fallen so far that consumers have lost confidence.

NEW YORK METAL MARKET PRICES

	May 14, 1924 Cents per Pound	May 21, 1924 Cents per Pound
Copper, electrolytic	13¼—13⅜	12⅞—12¾
Lead, Am. S. & R. price	7.50	7.25
Antimony	8⅛	8⅛
Nickel, ingot	27	27
Zinc, spot	6.22½	6.05
Tin, straits	46	41½
Aluminum, 98 to 99 per cent	28½	28

Duty Proposed on Copper Imports

A DUTY of 6 cents per pound on imports of copper is proposed in a bill introduced by Representative James of Michigan. The bill takes the form of an amendment to the existing tariff act. Mr. James says a duty on copper is necessary to conserve one of our important resources, to enable the producers to pay a living wage to their employees, to enable the owners of American copper mines to be sure of the return of a portion of their investment and to protect the great American industry from ruin due to foreign competition.

New England Trade Steady—Pole-Line Material Active

CENTRAL-STATION purchases of pole-line material dominated the electrical market in this section as the week opened. The demand for other supplies was rather colorless, although a large volume of business is being handled by jobbers. The building industry is absorbing well-distributed consignments of wire and wiring devices, metal-working concerns are buying motors on a modest scale, and interest in industrial heating is active. Five electric furnaces have been sold in Worcester during the last thirty days. The sale of labor-saving appliances is responsive to sustained field efforts. Watt-hour meters are moving very well, and total sales in these six states are holding close to previous record-breaking values.

The absence of life from the market is mistakenly interpreted by some to indicate that a very low volume of business is being transacted, whereas the actual totals represent the demands of a great and growing industry, comparing favorably in many lines with recent years. Thus, even in the face of undeniable depression in the great textile industry, the total sales of electric motors in New England are around 75 per cent of last year's corresponding figures. Profits are none too satisfactory in many lines, and the public is becoming restive under heavy taxation burdens. Competition is sharp and prices are weak in general trend.

Poles and Pole-Line Hardware Active in Southeast District

THAT the demand for electrical construction materials will be well sustained is evidenced by the volume of construction in the Southeast during April. The contracts awarded amounted to $53,994,000, this being a gain of 29 per cent over the previous April. Damage done by recent storms in this section has stimulated the demand for poles, shipments on which are reported fairly satisfactory. Cross-arms and pole-line hardware are active, but pins and insulators are somewhat slow. A steady and increasing demand for distribution transformers is to be noted, this being occasioned largely by increased range sales in the smaller centers.

Orders from central-station companies are fairly good and excellent purchases by telephone companies are reported, the demand for cable being in excess of the supply. Several jobbers are in receipt this week of requests for bids on a considerable amount of mill-construction materials under contracts recently closed, and other inquiries are anticipated. Old-house wiring is causing a brisk demand for armored conductor and a satisfactory activity in rubber-covered wire of the popular sizes. Weatherproof wire, however, is somewhat slow, not keeping pace with the demand for other line materials.

The warmer weather has slowed down the radio business a bit, though it is still considered satisfactory. The outlook for the fall business is excellent, and during the summer stocks will be accumulated in anticipation of a brisk demand.

Building Material Lines Moving Best in New York District

THE general slowing down of business in the New York district is still apparent, all lines being equally affected. Manufacturers of apparatus and dealers are abstaining from the purchase of any materials for stock purposes and buy apparatus only as required to meet current sales. Industrial business is probably hit the hardest, so that manufacturers whose business formerly was entirely with industrials are taking on new lines such as materials for general sale.

The only lines that are moving actively among the jobbers are armored cables and boxes, lines in which practically no profit is made. Other lines are uniformly slow. There is little appliance buying, and radio has fallen off more than usual. This condition is said to be largely due to the present political situation, which has aroused unfavorable comment from almost the entire industry. With the slowing down of business, manufacturers' stocks are in good shape and they are able to make deliveries rather promptly. Price competition is very keen; in fact, it is worse than it has been in several years. Collections are slowing up a little due to the falling off in business.

Middle West Utility Buying Normal—General Trade Erratic

ALTHOUGH general business declined somewhat in the Middle West territory this week, and while the feeling expressed by the electrical trade in this district is generally optimistic, the present situation is not well understood. The Chicago district at the present time is enjoying an active building program, but in spite of this business in most instances is dull. Distributors' stocks are low, in some cases entirely exhausted, but buying is fitful and erratic and still on a hand-to-mouth basis. Central-station purchases have been normal in accordance with expansion programs laid down in the spring.

Copper products dropped ½ cent per pound base May 16. Prices have otherwise been firm, with the exception of rubber-covered wire, flexible armored cable and steel pipe. Several low quotations were made on the first two items, and on steel pipe the price is being slashed consistently, one point at a time, until the market is practically broken and no established price is maintained. It appears generally that it is fast becoming a buyers' market, and where large orders are involved competition is especially keen. Radio sales have proved no exception to the rule and have fallen off considerably this week. Extensive advertising is being conducted to stimulate radio sales through the summer months. The call for fans has been considerably delayed by the cool spring. Interest in regular lines of appliances has not been up to expectations.

Business Good, Although in Decreased Volume, on Pacific Coast

THE electrical business on the Pacific Coast is considered good, although its volume has decreased somewhat and very little pessimism exists. However, it is generally believed that no outstanding sales will be made during the year, and nothing large is expected to materialize until 1925. A certain amount of lateral power extension and of railroad improvements have been postponed which otherwise would have been reflected in direct ordering and would have indirectly resulted in benefits to the country communities affected.

The pole-line hardware market has dropped about 5 per cent except in the case of flat cross-arm braces, which have shown a price decrease of about 10 per cent. Local stocks of these commodities are high, and inquiries for several carload lots are reported. A brisk business has developed in window and industrial reflectors, due to educational campaigns, which have materially helped the market at a time when staple buying has been cut to a minimum, so that it is decidedly appreciated. Curling irons are selling well in the retail stores, and jobbers report good orders on appliances, evidently in preparation for "June bride week." Two-and-a-half-inch class C iron-box bells have dropped about 15 per cent to a market price of about 42 cents each, and there is keen competition in all such electrical hardware. Fan sales have jumped considerably during the past week.

Activities of the Trade

Devoted to News of the
Manufacturer, Jobber, Agent, Contractor and Dealer, Including Important Orders and Contracts for Apparatus and Equipment

135 Manufacturers Exhibit at N. E. L. A. Convention

The manufacturers' exhibition at the forty-seventh convention of the National Electric Light Association, held at Atlantic City this week, was the greatest ever made accessible to the central-station industry. There were 135 separate booths, as compared with 98 in the last exhibition, which was also held at Atlantic City two years ago. Not one manufacturer a member of the association who desired to exhibit at the convention was denied the privilege and the opportunity of taking part.

Practically every variety of equipment in which the central station is interested was on exhibit, and the display was complete and comprehensive. All the booths were carefully arranged, and the layout was such as to increase interest in the apparatus and make it easy to study. Frank H. Gale, chairman of the exhibition committee, and L. W. Shugg, director of exhibits, are to be congratulated on the success achieved.

The Tork and Electric Outlet Companies Elect Vice-president

The Tork Company, manufacturer of Tork clocks and other automatic electrical devices, announces the election of Ralph D. Ward as vice-president of the company. Mr. Ward was formerly vice-president of the Ward Baking Company and is also president of the Electruck Corporation. The Electric Outlet Company, originator of "elexits" and other wiring devices, also announces the election of Mr. Ward as vice-president, coincident with the company's intention to place on the market its own line of special wiring devices.

The Tork Company and the Electric Outlet Company share the same executive and sales offices at 8 West Fortieth Street. E. Cantelo White is president and general manager of both companies.

National Carbon Company Extends Service Facilities

The National Carbon Company, Inc., New York, on May 1 last moved its Chicago brush-finishing plant from 560 West Congress Street to new and larger quarters at 551 West Monroe Street, where much better facilities will be afforded. The new location will enable the company to double its output and extend better service in the Chicago district.

The Chicago brush-finishing plant was the first of its kind established by the National Carbon Company, and owing to the success obtained at this service plant similar emergency plants have since been established at New York City and Pittsburgh. The establishment of a fourth emergency plant at Cleveland is now in process, which will enable the company to give emergency service in the Cleveland district. The company feels that with these four emergency plants, situated at strategic points in the industrial centers of the country, it will be possible to render special brush service as required by the trade at all times.

Westinghouse Electric Report Shows Improved Earnings

The Westinghouse Electric & Manufacturing Company, in its report for the year ended March 31, 1924, shows that gross earnings amounted to $154,412,918, which exceed those of any previous year in the history of the company except the year ended March 31, 1919. The value of unfilled orders at the close of the fiscal year was $63,738,702, which compares with last year's figures of $61,914,237. The net income available for dividends was $16,125,303. Total current assets, including inventories of $80,000,000, were $153,209,401, equal to more than six times the total current liabilities, which were $25,730,413.

New stock to the value of $17,955,000 was offered for subscription by the stockholders payable on April 16, and a stock dividend of 10 per cent, or $10,773,000, was declared payable to stockholders of record May 2, 1924. General Guy E. Tripp, chairman of the board, calls attention to the fact that 31,819 employees were insured under the company's insurance and saving plan and that the total amount of savings held in the fund on March 31, 1924, was $2,845,853.

Allis-Chalmers Business Increases

The Allis-Chalmers Manufacturing Company reports that its incoming business was substantially better in April than in previous months. April bookings approximate an increase of about 20 per cent over March. The May volume so far has been maintained, and a continuation for the next two months at least is expected. Orders are still somewhat under the corresponding period in 1923, but conditions are said to be materially better than during the first quarter.

Westinghouse to Transfer Fan Department to Massachusetts

To make room for meter production at its Newark (N. J.) factory, the Westinghouse Electric & Manufacturing Company plans to transfer its electric fan department next fall to its works at East Springfield, Mass., which will require about 150 additional employees at East Springfield. The present punch-press shop will be doubled in size and a new steam-heating plant of 2,000 boiler hp. rating will be added.

Electric Truck Manufacturers Join in Co-operative Program

Electric industrial truck manufacturers, in co-operation with the Society for Electrical Development, have adopted joint plans for an educational program. At a meeting held at the headquarters of the Electrical League of Cleveland on May 9 it was unanimously decided to launch a business-building program in parallel with the electric truck business development program, under which the manufacturers of electric street trucks, batteries and accessories, with the co-operation of the Transportation Bureau of the National Electric Light Association and the Society for Electrical Development, are working together along educational lines.

The plan was unanimously adopted by the Automatic Transportation Company, Baker R & L Company, Crescent Truck Company, Lakewood Engineering Company, Elwell-Parker Electric Company and Yale & Towne Manufacturing Company, which were represented at the meeting, and it is expected that the other companies will subscribe to the idea. Another meeting to outline the work to be done will be held at the time of the electric railway convention at Atlantic City on June 16.

General Electric High-Pressure Turbine for Boston Edison

The General Electric Company is installing two 30,000-kw. turbines in the East Weymouth station of the Edison Electric Illuminating Company of Boston. The turbine on each of these two sets will operate at 350 lb. steam pressure and will drive a generator of 30,000 kw. capacity, 14,000 volts, which will have connected to it a service generator of 2,000 kw. capacity, generating at 2,300 volts.

There is also now under construction at the Schenectady works of the General Electric Company a 2,400-kw., 3,600-r.p.m. turbine, which will operate at steam pressures between 1,000 lb. and 1,200 lb., 700 deg. F. total temperature. This turbine, which will be in operation some time this year, will exhaust directly into the header of the lower-pressure machines now being installed. The generator on the high-pressure unit will have a capacity of 3,100 kw. at 14,000 volts.

The Waverly Oil Works Company, Pittsburgh, announces a change in its selling policy and will hereafter sell mine lubrication entirely through local supply houses. It has also decided to sell its industrial oils and greases through these channels of distribution, although it will continue to sell direct to its present customers.

The R. E. Thompson Raido Corporation, Jersey City, N. J., has been organized to take over and expand the R. E. Thompson Manufacturing Company and the Wireless Improvement Company, 66 York Street, Jersey City. The new organization has arranged for a stock issue of $587,500, a portion of the proceeds to be used for expansion. R. E. Thompson is president.

The Wireless Dry Cells, Ltd., of Ontario, Canada, capitalized at $300,000, has filed a certificate of incorporation in New York State. An office has been established at 904 Buffalo Avenue, Niagara Falls, N. Y. The corporation will manufacture batteries of all kinds.

The Chicago Fuse Manufacturing Company, Chicago, announces the appointment of A. E. Treganze as assistant to the president in charge of commercial relations. Mr. Treganze was formerly sales manager of the Economy Fuse Manufacturing Company of Chicago.

The Atlantic-Pacific Agencies Corporation, San Francisco, has announced that it has recently been made Pacific Coast representative for a number of Eastern manufacturers. The firms and their products are as follows: Spartan Electric Company, New York, Spartan loud speakers; Hammerlund Manufacturing Company, New York, Hammerlund condensers; Best Manufacturing Company, Newark, N. J., Best headphones; Liberty Transformer Company, Chicago, Liberty transformers; Electric Equipment & Manufacturing Company, Toledo, Ohio, busbar and switch mountings.

Landers, Frary & Clark, New Britain, Conn., have issued a new price list covering their line of electric heating devices. New goods recently added to the assortment are listed, and revised prices have been adopted on some items.

The Globe Electric Supply Company, Denver, has been appointed Rocky Mountain distributor for the Eden washing machine and for the Illinois Wire & Cable Company. Warehouse stocks are now being carried on both of these lines.

Williams & Rose have purchased the franchise of the X-Cel-All Master-Lite Company, Denver, from Lawrence & Griffing, who have been operating the company since last December. The members of the old firm will return to the Pacific Coast to engage in other lines of business.

The Lovell Manufacturing Company, Erie, Pa., has recently placed on the market a new portable electric clothes wringer designed for use with washing machines not provided with power wringers and as an auxiliary in laundry equipment.

The Westinghouse Electric & Manufacturing Company, has recently put on the market a new electric heater known as the "Solar Glow." The heater is a combination of the convection and the radiation type.

The Edward Valve & Manufacturing Company, East Chicago, Ind., has been represented in the New York district since May 1 by the Dunbar Engineering Company, 50 Church Street, New York City.

The John A. Roebling's Sons Company, South Broad Street, Trenton, N. J., manufacturer of electrical wires, has awarded a general contract for the construction of a one-story addition, 138 ft. x 300 ft., estimated to cost $200,000, with machinery. It will be used for increased output. The company has obtained an order from the Virginian Railway Company, Norfolk, Va., for 2,000,000 lb. of copper wire for transmission-line service in connection with the proposed electrification of a portion of its road.

The Lapp Insulator Company, Le Roy, N. Y., has filed plans for the erection of a new addition to its plant to provide for increased production. The estimated cost has not been announced.

The Electruck Corporation, New York, Rabenold & Scribner, attorneys, 61 Broadway, will install a plant for the assembling of electric motor trucks in a building acquired at 532-38 West Forty-sixth Street. The company was organized recently with a capital of $1,000,000. R. D. Ward is president.

The Hoosier Telephone Equipment Company, Indianapolis, organized to manufacture radio and telephone apparatus, has arranged for the operation of a plant at 2801 Highland Place. E. A. Linville is president.

The Western Electric Company has announced plans for the construction of new quarters for its Kansas City branch. The new building is to be a three-story structure erected at Seventeenth Street and Baltimore Avenue and will be a complete plant including warehouse, stockrooms, salesrooms, offices and truck docks. This branch serves four and a half states, with offices at Omaha, Tulsa, Okla., and Oklahoma City. W. B. DeForest, local manager, states that the move is made necessary by increase in the company's business, which has now thirty times the volume that it had twenty years ago, when the present location was first occupied.

J. D. Wallace & Company, 1401 West Jackson Boulevard, Chicago, manufacturers of woodworking machinery and machine tools, have just built a new plant at 134 South California Avenue, Chicago. The plant is of one-story, fireproof, daylight construction, and is built to conform to modern manufacturing practice. Half of the plant is now ready for occupancy, and the second section will be started in the near future.

The Celite Products Company, 53 West Jackson Boulevard, Chicago, manufacturer of heat-insulating products, announces that a 1924-5 schedule is now being arranged for delivering the illustrated lecture on heat transfer and high-temperature insulation which has been prepared by the engineering department of the company and already delivered before the engineering classes at approximately fifty of the large universities throughout the country.

The Beaver Machine & Tool Company, 625 North Third Street, Newark, N. J., manufacturer of electrical specialties, has just placed on the market a new armored attachment plug. The plug is of full standard size and is made up by armoring the company's standard attachment plug.

New Equipment Available

Short Descriptions of New Apparatus and Accessory Equipment of Interest to the Electrical Industry and Available from Manufacturers and Announcements of New Lines

Leakproof Sleeve Bearing

A new type of sleeve bearing for electric motors, designed to prevent the leakage of oil into the windings or the entrance of dust and grit into the bearing, has been developed by the Westinghouse Electric & Manufacturing Company. This new bearing, known as the "sealed-sleeve" bearing, is so constructed that it is almost airtight.

The bearing is so arranged that a connecting passage in the upper part of the housing produces a condition of balanced air pressure in the separate chambers into which the housing is divided by the bearing supports. For inspection of the oil ring a large airtight threaded pipe plug is provided. An inclosed combination filling and overflow opening is placed in the side of the bearing, and a rigid cast-iron cover is bolted over the oil-ring slot and made airtight by an oil-proof packing.

Where the shaft passes through the bearing the felt dust-proofing washer used is provided with a metal cap having a diameter at least ¼ in. larger than the shaft diameter. This prevents the felt from being compressed close to the shaft. Thus it is left free to expand and acts like a brush so that it does not mar or glaze.

Motor Pulley.—A new iron-center, wooden-rim motor pulley has been developed by the Dodge Manufacturing Corporation, Mishawaka, Ind. This pulley embodies the same principles of wooden pulley construction that have been used in the Dodge wooden rim pulley and is a development of the Dodge idea of compression fastening and interchangeability of bushing to shaft.

Drum Oil Tester.—To facilitate the testing of oil in transformer drums without the necessity of drawing samples, a new device has been developed by the General Electric Company which can be used in connection with any 25-kv. or 30-kv. testing transformer, with the exception of those having the middle point of their high-tension winding grounded. By means of this new tester the oil-testing gap is inserted into the drum through the bung and an immediate indication of the condition of the oil is given. A flexible protective carrying case is provided for the device.

Voltmeter.—A direct-current radio voltmeter with a double range, 0-6 volt and 0-120 volt, and having a self-contained resistor and switch for connection to both ranges, has been developed by the Roller-Smith Company, New York. The instrument has a high resistance, averaging about 100 ohms per volt. It is furnished in both flush and surface cases.

New Trade Literature

GROUNDING SERVICE.—The Groundulet Company, Newark, N. J., has issued a booklet entitled "Groundits and Groundology," which illustrates and gives instructions for using its various types of "groundits" for grounding service. It also contains a table giving the effective resistance of copper conductor and metal raceways and diagrams showing different code violations.

BELTING. — "Driving with Duxbak Leather Belting" is the title of a booklet published by the Charles A. Schieren Company, 37 Ferry Street, New York City, which gives practical facts about belting, including types of drives, rules and ratings, plant layout, belting tables, leather packings, etc.

MOTORS.—The Champion Electric Company, 3711-41 Forest Park Boulevard, St. Louis, is distributing a bulletin describing the various types of the "Champion" endurance motors.

PORCELAIN INSULATORS. — Bulletin No. 40 issued by the General Porcelain Company, Parkersburg, W. Va., covers its porcelain insulators (wet process) for telegraph, telephone and electric light service. Bulletin No. 41 describes its high-tension porcelain insulators.

ELECTRIC TRUCKS. — The Lansden Company, Inc., Danbury, Conn., is distributing a folder calling attention to its electric trucks. It contains illustrations of the first Lansden electric truck, "Adam," built in 1904 for the Adams Express Company, and of various later types of trucks.

FUSES FOR ELECTRIC CIRCUITS.—The Bussman Manufacturing Company, 3,819 North Twenty-third Street, St. Louis, is distributing catalog No. 12 of "Buss" products. It also includes a simple, non-technical treatise on fuses and their use.

BLOWERS.—The L. J. Wing Manufacturing Company, 352 West Thirteenth Street, New York City, has issued bulletin No. 26, describing the "Wing" type EM blower for burning small anthracite, screenings and slack.

CABLE-REEL TRAILER. — Bulletin A-105 issued by the Mercury Manufacturing Company, 4,118 South Halsted Street, Chicago, describes and illustrates its cable-reel "Lif-Trans" trailer.

EXHAUST FANS.—The Northern Blower Company, West Sixty-fifth Street and Wheeling & Lake Erie Railway, Cleveland, is distributing bulletin F1002, covering the "Norblo" exhaust fans.

Foreign Trade Opportunities

Following are listed opportunities to enter foreign markets. Where the item is numbered, further information can be obtained from the Bureau of Foreign and Domestic Commerce, Washington, by mentioning the number.

Purchase and agency is desired in Madras, India (No. 10,209), for generator for electric lighting plant.

Purchase is desired in Granada, Spain (No. 10,221), for radio apparatus.

TENDERS FOR TELEPHONE SYSTEM FOR KINGSTON, JAMAICA.—Tenders will be received by the Colonial Secretary, Kingston, Jamaica, until August 1 for the establishment of a modern telephone system and telephone exchange in the corporate area of Kingston and St. Andrew.

PROPOSED ELECTRIC PLANT AT CHITRE, PANAMA.—An agreement has been entered into between the Secretary of Public Works of the government of Panama and Amado y Compañia, whereby the latter is to install an electric light and power plant and ice factory at Chitre, in the province of Herrera, a town of about 3,000 population. Under the terms of the concession the government is to grant land and other facilities for the installation of the plant and will pay for lighting of the streets and public buildings. The contract stipulates that work must be started within six months after approval of the contract.

THE ELECTRIFICATION OF PRIVATELY OWNED RAILROAD IN SWEDEN PROPOSED.—Following the electrification of the Swedish State Railroads between Stockholm and Gothenburg, now under way, it is proposed to electrify at least ten of the privately owned railroads, according to advices made public by the American-Swedish News Exchange, 52 Vanderbilt Avenue, New York City. The private lines, which are being studied by a special commission with a view of electrification, all run through central and southern Sweden in the most densely populated and highly industrialized regions of the country. Closely related to the progress of railway electrification in Sweden is the news that the Waterfalls Administration has requested an appropriation of $1,600,000 from the Riksdag toward the construction of a new hydro-electric plant in northern Sweden. The proposed plant will be built on the Umea River and will utilize waterfall purchased by the Government in 1917.

New Incorporations

THE CITIZENS' LIGHT, HEAT & POWER COMPANY, Humboldt, Iowa, has been incorporated with a capital stock of $50,000 by D. M. Stearns and others.

THE BURLINGTON (OKLA.) LIGHT & POWER COMPANY has been incorporated by C. C. Watson, Theodore Kurz and others. The company is capitalized at $10,000.

THE SOUTHWEST POWER COMPANY, McAlester, Okla., has been incorporated with a capital stock of $3,000,000 to take over the properties of the Choctaw Power & Light Company, McAlester, Okla., and the Coal District Power Company, Huntington, Ark. Albert Emanuel, 61 Broadway, New York City, is president.

Construction News

Projects, Plans, Bids and Contracts, Contemplated or Under Way

New England States

WAYNE, ME.—The Central Maine Power Company, Augusta, is reported to be purchasing property in this section for a proposed power dam and hydro-electric power plant on the Androscoggin River.

COLEBROOK, N. H.—The William F. Allen Company contemplates erecting a number of rural lines beyond Colebrook Village this year. L. M. Lombard is treasurer.

LYNN, MASS.—The Lynn Gas & Electric Company has secured permission to issue $1,015,625 in capital stock, part of the proceeds to be used for expansion to its system.

PAWTUCKET, R. I.—The Blackstone Valley Gas & Electric Company plans to issue $1,300,000 capital stock, a part of the proceeds to be used for extensions and improvements.

NEW HAVEN, CONN.—The New Haven Sawmill Company plans to equip its plant for electrical operation throughout.

Middle Atlantic States

BUFFALO, N. Y.—The City Council is considering the installation of a luminous-arc-lighting system on Abbott Road, South Park Avenue and Triangle Street.

COPENHAGEN, N. Y.—The Deer River Power Company plans to extend its transmission line 1 mile and is making surveys for one or two reservoirs. V. C. Wood is manager.

EARLVILLE, N. Y.—The Earlville Electric Light Company expects to erect 2 miles of rural line and to install street lamps in Poolville and Hubbardsville. John R. Parsons is president.

FILLMORE, N. Y.—The Genesee Valley Power Company plans to extend its distribution system from Belmont into Scio. H. G. Young is superintendent.

FORT TOTTEN, N. Y.—Bids will be received by the Ordnance Officer until June 5 for 32,000 ft. cable, nineteen-conductor. (Circular 3.)

HERMON, N. Y.—The Hermon Electric Light Company contemplates erecting about 3 miles of rural lines. W. C. Popple is secretary.

MACHIAS, N. Y.—The Olean (N. Y.) Electric Light & Power Company has been granted authority to extend its electric system into the town of Machias.

MALONE, N. Y.—Extensions and improvements contemplated by the Malone Light & Power Company this year include the installation of a new switchboard at the Malone switching station, a new substation at Brushton and rebuilding several lines. F. J. Elder is treasurer.

MONROE, N. Y.—The Orange & Rockland Electric Company is erecting a transmission line to connect with the system of the Rockland Light & Power Company at Hillburn and plans to build a line to connect with the Orange County Public Service Company, Inc., during 1924.

ROCKVILLE CENTER, N. Y.—Work will soon begin on the construction of a new power station for the municipal electric station. Diesel-engine equipment will probably be installed. H. C. Major is superintendent

ROME, N. Y.—The Northern New York Utilities, Inc., is considering erecting a transmission line to Lee Center, 8 miles distance. The cost is estmated from $40,000 to $50,000, which would include a substation.

BRIDGETON, N. J.—Plans have been prepared by Stearns & Woodnutt, architects, Stephen Girard Building, Philadelphia, for a hospital building, power house and boiler house, to cost about $425,000, for the Bridgeton Hospital Association.

KEYPORT, N. J.—The Monmouth Lighting Company plans to erect 3½ miles of 33,000-volt transmission line to connect with Freehold by a new route and to install one bank of 2,000-kva. 6,600/33,000-volt transformers. J. E. Hill is general manager.

NEWARK, N. J.—Bids will be received by R. D. Argue, secretary Board of Education, City Hall, until June 4, for electrical supplies, electric lamps, etc., for the city schools.

HARRISBURG, PA.—Bids will be received by the Department of Property and Supplies, Capitol Building, until June 10 for alterations and extensions to the present power plant in the Capitol Building, including a drinking-water refrigeration system. Arnold W. Brunner, 101 Park Avenue, New York City, is architect.

HOMESTEAD, PA.—The Carnegie Steel Company has been granted permission by the Federal Power Commission to construct a transmission line across the Monongahela River.

PITTSBURGH, PA.—The D. L. Clark Candy Company, Martindale Street, contemplates building a power house, to cost about $45,000. P. Dietz, Lyceum Building, is engineer.

PITTSBURGH, PA.—Bids will be received at the office of the United States Engineer, Pittsburgh, until June 11 for furnishing two hydro-electric generating plants for locks Nos. 7 and 8, Monongahela River.

BALTIMORE, MD.—The Department of Lamps and Lighting is considering extensions in the street-lighting system on a number of thoroughfares.

BALTIMORE, MD.—Plans are under consideration for the reconstruction of the power house at the Maryland Penitentiary, including the installation of additional equipment. Claude B. Sweezey is warden.

SNOW HILL, MD. — The Council has authorized tentative plans and estimates of cost for the proposed municipal electric power plant.

MEADOW VIEW, VA.—The Edmondson Electric Company, it is reported, contemplates the construction of a dam and power plant at Avon's Ford on the Holstein River.

NORFOLK, VA.—The Virginian Railway Company plans to build substation in connection with the electrification of a section of its lines.

PULASKI, VA.—M. R. Schottland, Martinsville, Va., plans to install a 350-kva. steam-operated electric plant at his proposed local furniture factory, to cost about $150,000.

WASHINGTON, D. C.—Bids will be received by the Chief Signal Officer, United States Army, Washington, until June 2, for 67,840 ft. cable and reels. (C. P. 17886-3.)

WASHINGTON, D. C.—Bids will be received by the General Purchasing Officer, Panama Canal, until June 5, for electric storage batteries, motion-picture projectors, and other equipment. (Circular 1611.)

North Central States

BIG RAPIDS, MICH.—The installation of an ornamental lighting system in the business section is under consideration by the Exchange Club.

HOUGHTON, MICH.—The erection of an additional three-phase, 11,000-volt circuit between Laurium and Mohawk, a distance

of 7.7 miles, is under consideration by the Houghton County Electric Light Company. R. P. Schumaker is purchasing agent.

CLEVELAND, OHIO.—Bids will be received at the office of purchases and supplies, Room 227, City Hall, until June 12 for filter equipment, including electric elevator, transformers and pump-motor control, electric range, refrigerator, etc.

AUGUSTA, KY.—The Kentucky Power Company is building a new central station in Augusta, equipped with a Diesel oil engine and General Electric generator of 330 hp. (initial unit). Other units not yet decided upon. The company is finishing transmission lines to Germantown and Brooksville (13,800 volts) and will extend its lines to Dover, Minerva, Johnsville, Lenoxburg, Gertrude, Berlin and to practically all other towns in Bracken County. Barrett Waters is president and general manager.

ATTICA, IND.—The Attica Electric Company contemplates rebuilding the local distributing system. C. V. Sorenson is vice-president and general manager.

CONNERSVILLE, IND.—The Common Council has authorized an appropriation for extensions and improvements in the firealarm system.

AURORA, ILL.—The installation of a new lighting system on the downtown streets is reported to be under consideration.

KEWANEE, ILL.—Bids will be received by R. R. Haley, city clerk, until June 2, for furnishing material and installing a complete electric distributing system. The Burns & McDonnell Engineering Company, Interstate Building, Kansas City, Mo., is engineer.

CHIPPEWA FALLS, WIS.—The City Council is considering extensions to the street-lighting system.

SAUK CITY, WIS.—The Village Council has decided to install an ornamental lighting system, consisting of thirty-two lamps, on Main Street.

WEST BEND, WIS.—The City Council is considering replacing the present street-lighting system with ornamental lamps on Main Street, Fourth Avenue and on Eighth Avenue, extending to Spruce Street.

WISCONSIN RAPIDS, WIS.—The City Council is considering the installation of an improved street-lighting system in various sections of the city.

DETROIT, MINN.—The Council has arranged a bond issue of $50,000 for extensions and improvements to the municipal electric plant. L. P. Wolff, Guardian Life Building, St. Paul, is engineer.

THIEF RIVER FALLS, MINN.—The Midland Power Company plans to extend its transmission line from Terrebonne to this locality, and later it will probably be extended to Red Lake Falls.

FORT MADISON, IOWA. — The Fort Madison Electric Company contemplates installing an additional 500-kva., 11,000/2,300-volt transformer at the local substation. C. C. Buffum is superintendent.

IOWA FALLS, IOWA.—The Iowa Falls Electric Company contemplates extensions and improvements in its generating plant, to cost $100,000. The transmission line will be extended from Garner to Brett, Wis., about 11 miles. The present line between Dows and Belmond, about 20 miles, will be rebuilt.

ORANGE CITY, IOWA.—The Electric Light and Water Department is considering the installation of a new generating unit of 100 kw. or 200 kw. capacity in the municipal plant this year. Frank E. Siefker is superintendent.

VILLISCA, IOWA.—Arrangements are being made by the Council for the installation of a municipal electric plant, for which bonds for $67,000, have been approved.

CALLAO, MO.—A special election will be held on May 27 to vote on the propcsal to grant the North Missouri Power Company, Excelsior Springs, a twenty-year franchise to furnish electricity in Callao. Energy to operate the municipal system is now obtained from the municipal electric plant at Macon.

CARUTHERSVILLE, MO.—Application has been filed with the Public Service Commission by the Arkansas-Missouri Power Company for permission to issue $664,000 in bonds, the proceeds to be used to acquire the electric properties at Caruthersville, Kennett and Hayti. If granted, $25,000 will be expended for improvements at Caruthersville and $16,000 at Kennett. The company also contemplates taking over the properties at Cardwell, Campbell, Clarkson Senath, Bragg City, Pascola, Steele, Holland and Cooter.

ELMER, MO.—The North Missouri Power Company, Excelsior Springs, has contracted to furnish service in Elmer, Arbela and Luray. A transmission line will be built to connect with the lines of the Mississippi River Power Company.

HARTVILLE, MO.—Bids will soon be asked for the construction of the proposed municipal hydro-electric plant. The Alexander Engineering Company, Woodruff, Building, Springfield, is engineer.

KANSAS CITY, MO.—Extensions and improvements contemplated by the Kansas Power & Light Company during the year include the installation of a 30,000-kw. generator, building one 15,000-kva. automatic substation, one 3,000-kw. automatic Edison station and changing over a 20,000-kva. substation from hand to automatic operation.

WILLOW SPRINGS, MO.—The Willow Springs Power Company is planning to erect a transmission line to Cabool, Mansfield and vicinity. The company has recently secured a franchise at Mountain Grove and plans to install a local system.

BOWMAN, N. D.—The Bowman Electric Company will install an engine and boiler and also an ornamental lighting system and overhaul all lines. W. H. Thomas is president and manager..

RUGBY, N. D.—The Rugby Light & Power Company contemplates the installation of a 75-hp. oil engine directly connected to a direct-current generator. M. A. Erickson is owner and manager.

HOT SPRINGS, S. D.—Bids will be received by the Board of Managers, State Soldiers' Home, until July 8, for a 70-hp. engine, electric generator, switchboard, instruments, etc.

BLUE HILL, NEB.—The Blue Hill Municipal Power Company contemplates installing an electrolier street-lighting (series) system. J. S. Holmquist is superintendent.

DE WITT, NEB.—The Municipal Water and Light Commission is planning to replace the present 35-hp. engine with a 40-hp. engine and to install a new street-lighting system on Main Street (probably ornamental). C. L. Paine is commissioner.

SCHUYLER, NEB. — Improvements are contemplated to the municipal electric light plant, including the installation of a new boiler and possibly buiding a smokestack. J. A. Kubic is superintendent.

HUTCHINSON, KAN.—The United Power & Light Company has purchased the properties of the United Water, Gas & Electric Company, Hutchinson, and the Salina (Kan.) Light, Power & Gas Company and will merge the systems. Extensions to the systems are under consideration.

KANSAS CITY, KAN.—The Department of Water, Light and Power contemplates installing two 600-hp. Babcock & Wilcox boilers and one 12,500-kva. Westinghouse turbo-generator in the municipal electric plant. The lines and equipment of the Kansas City (Mo.) Power & Light Company that served the former city of Rosedale, now part of Kansas City, Kan., has been acquired by the municipal system. James D. Donovan is superintendent and chief engineer.

SALINA, KAN. — The Public Service Company of Oklahoma plans to erect a transmission line from Pryor, Okla., about 12 miles. It is also proposed to build a transmission line from Vinita to Nowata, Okla. A substation is in course of construction at Vinita.

Southern States

BENSON, N. C.—The Council is considering the installation of thirty-five ornamental lamp standards in the business district within the next few months. T. Eldridge is superintendent.

WILSON, N. C.—The Municipal Electric Department contemplates extending the lines of the municipal electric plant to Lucoma and Kenly during this year. R. J. Grantham is superintendent.

SAVANNAH, GA.—The Savannah Electric & Power Company contemplates redesigning its entire distribution system and is now moving a 3,000-kw. turbo-generator from its fifty-fourth Street plant to the Riverside station. R. C. Brooks is local manager.

SUMMERVILLE, GA. — The Georgia Railway, Light & Power Company contemplates extensions and improvements in the local distributing system, recently acquired.

OCALA, FLA.—The Florida Power Company is now installing a 1,500-hp. Smith waterwheel and a 1,350-kva. generator and erecting 60 miles of 60,000-volt transmission lines. E. J. Jones is general manager.

TUPELO, MISS.—The Mississippi Power & Light Company, Jackson, has acquired the power station at the Tupelo Cotton Mills. It has contracted to furnish the mills with electricity (1,300 hp.) and for large amount of steam for use in the mills, and has also made arrangements to supply the city with electricity for the municipality, including the waterworks pumping station. The company will operate the municipal electric plant until the power station at the mill can be enlarged sufficiently to furnish the service.

GADSDEN, ALA.—Plans submitted by the Alabama Power Company for the installation of a new ornamental lighting system, consisting of eighty lamps, to replace the present system, have been approved by the City Council.

MENA, ARK.—The local electric plant of the Commonwealth Public Service Company has been acquired by W. F. Moody and associates. Plans are under way for extensions and improvements to the system.

BATON ROUGE, LA.—The Baton Rouge Electric Company contemplates miscellaneous improvements to its power station, including a new 400-hp. boiler, to cost $106,850, and extensions to electric distribution system, to cost $54,570. T. P. Walker is manager.

LUVERNE, LA.—The installation of a new street-lighting circuit is under consideration by Water and Light Department. H. T. Strother is superintendent.

CHANDLER, OKLA. — The Chandler Electric Company plans to rebuild its entire distribution system. The company is considering erecting a high-tension transmission line from Chandler to Davenport and Key West and installing a new power plant here to furnish the service.

HOBART, OKLA.—The Inland Utilities Company, Kansas City, Mo., is negotiating for a local light and power franchise. Heretofore service has been furnished by the Hobart Electric Company, with franchise which expired March 4 and has not as yet been renewed.

BROWNSVILLE, TEX.—The City Commissioners have decided to extend the high-tension transmission line of the municipal electric system to the El Jardin district, a distance of more than 2 miles.

CHILDRESS, TEX.—The Texas Central Power Company is planning to erect a high-tension transmission line from Childress to Hedley, a distance of 45 miles.

CLAUDE, TEX.—An election will be held on May 31 to vote on the proposal to issue $35,000 in bonds to complete the lighting system.

EL PASO, TEX.—The City Council has rejected bids for a lighting system on a number of streets and will soon call for new bids. W. E. Stockwell is engineer.

HOUSTON, TEX.—Electric power equipment will be installed by the Southern Pacific Railroad Company at its proposed freight-car repair shops in the Englewood section, to cost about $500,000. H. M. Lull is chief engineer.

LONE OAK, TEX.—New interests have acquired the plant and system of the Lone Oak Light & Power Company, which plan extensions to the system.

OAKWOOD, TEX.—The Texas Power & Light Company has acquired the municipal electric plant and plans to extend its transmission line from Palestine to Oakwood, to supply electricity for the local system.

Pacific and Mountain States

BELLINGHAM, WASH. — The Puget Sound Power & Light Company contemplates 30 miles of line extensions during 1924. H. B. Sewell is manager.

MOUNT VERNON, WASH.—The Pacific Northwest Traction Company contemplates 25 miles of line extensions this year. H. B. Sewell, Bellingham, is manager of northern division.

SEATTLE, WASH.—Bids will be received by the Board of Public Works until June 27 for superstructure machinery and also for electrical equipment for a steel bascule bridge over Lake Washington Canal at Montlake Boulevard. J. D. Blackwell is city engineer.

SEATTLE, WASH.—The Seaman Paper Company has applied to the city for service from the municipal electric system (25,000 hp.), to be used at its proposed paper mill in this section. The cost of the plant is estimated at $1,500,000. A large substation is contemplated.

SNOHOMISH, WASH.—Steps have been taken for the installation of an ornamental street-lighting system on First Street.

GASTON, ORE.—H. W. Scott, Gaston, has made application to the State Water Department for permission to install and operate a hydro-electric plant on Scroggin Creek.

PORTLAND, ORE. — The Northwestern Electric Company contemplates building a substation on Seventeenth Street, near Overton Street.

DIXIELAND, CAL. — The Columbia Cement Company, Los Angeles, recently organized by Fred A. Ballin and associates, plans to build a power house at its proposed local cement mill. The cost of the project is estimated at $1,000,000.

GLENDALE, CAL.—The installation of an ornamental lighting system on Monterey Road is under consideration.

GLENDORA, CAL.—The Board of City Trustees is considering the installation of an ornamental lighting system, using pressed steel standards, on portions of Glendora, Whitcon, Wabash and Ada Avenues.

LOS ANGELES, CAL.—At an election held May 6 the proposal to issue $21,000,000 in bonds for further development of the electrical system was defeated.

LOS ANGELES, CAL. — The Southern California Edison Company contemplates the construction of a substation on East Fourth Street between Rose and Gaviota Avenues.

LOS ANGELES, CAL.—According to the monthly report of the Municipal Art Commission, which has given official approval to the designs for the street lamp standards, more than $400,000 will be expended in the near future for street lamps in various parts of the city as follows: Santa Barbara Avenue and Flower Street, $100,000; Alvarado Street, $60,000; Hillhurst Avenue, $50,000; Santa Monica Boulevard, $40,000; also other streets, including First Street, Beverly Boulevard, Bronson Avenue, El Centra Avenue, Orange Drive and Irving Boulevard.

MODESTO, CAL.—The directors of the Modesto Irrigation District have authorized bids called for $119,000 in bonds, the proceeds to be used for the construction of the Don Pedro power distribution system.

REDONDO BEACH, CAL. — The City Trustees are considering the installation of an ornamental street-lighting system on the Esplanade and on portions of Catalina Avenue, Pacific Avenue, Opal and Jasper Streets.

VENICE, CAL.—The installation of electric lamps on portions of Washington Boulevard and Ocean Front Walk, to cost about $25,000, is under consideration.

SHOSHONE, IDAHO.—The Town Council is considering the installation of a municipal electric light plant.

SALT LAKE CITY, UTAH.—Plans are being considered by the City Commission for the erection of a high-tension line to connect the city pumping plant with the substation of the Utah Power & Light Company at Murray. The cost is estimated at $14,500.

DENVER, COL.—Bids will be received by the City and County of Denver by and through the Board of Water Commissioners, Cleveland Place, until June 6 for the construction of filter plant and intake, including electrical equipment and work. Burton Lowther is chief engineer.

Canada

CAMPBELLTON, N. B. — The Town Council is considering a proposal submitted by the Lower St. Lawrence Power Company, Ltd., Rimouski, for additional power for the municipal system, under the terms of which the town of Campbellton will erect a 66,000-volt transmission line from Campbellton to Matapedia, a distance of 15 miles, and the company a similar line from Causapscal to Matapedia, 35 miles long.

OTTAWA, ONT.—Application has been made by the Hydro-Electric Power Commission of Ontario, Toronto, to the provincial government for certain water leases in connection with the proposed Ottawa River power development. The sites asked for are located on the Ottawa River between Ottawa and Pembroke and include Chads Falls, Du Ford Falls, Des Joachims Falls and Alumette Falls. The plans provide for an ultimate development of about 700,000 hp.

STRATFORD, ONT.—A bylaw has been prepared by the City Council providing for an appropriation of $40,000 for extensions to the local Hydro system.

MONTREAL, QUE. — Plans are under consideration to install 26,500 ft. of conduit cables in the district bounded by St. Laurent, Derri, Craig and Commissioner Streets, to cost about $25,389.

Electrical Patents

Announced by U. S. Patent Office

(Issued April 22, 1924)

1,491,492. TRANSMISSION MECHANISM; R. R. Owen, New York, N. Y. App. filed March 16, 1916. For transmitting power from a prime mover.

1,491,498. METHOD OF ELECTROLYSIS; U. C. Tainton, Johannesburg, Transvaal, South Africa. App. filed Jan. 5, 1921.

1,491,519. ELECTRICAL APPARATUS; D. Conlan, Jr., Brooklyn, N. Y. App. filed Dec. 31, 1920. For establishing branch connections with mains of feeder circuit.

1,491,525. CONTROL FOR MOTOR VEHICLES; J. B. Entz, New Rochelle, N. Y. App. filed Nov. 5, 1920. Comprising two or more dynamo-electric machines.

1,491,543. METHOD OF AND APPARATUS FOR ELIMINATING DISTURBING EFFECTS; A. Meissner, Berlin, Germany. App. filed May 3, 1922. When receiving messages in wireless telegraph and telephone stations.

1,491,600. ELECTROMAGNETIC SEPARATOR; B. E. Fernow, Jr., Milwaukee, Wis. App. filed July 2, 1921. For extracting free magnetic particles from flowing substances.

1,491,692. STATION INDICATOR; M. H. Gomez, Old Albuquerque, N. M. App. filed July 29, 1922. Adapted for use on railway cars, for indicating the stations and to provide for the illumination of separate signals.

1,491,712. VEHICLE INDICATOR; F. W. Low, Vallejo, Cal. App. filed Sept. 26, 1921. Automatic direction and tail-light illumination indicator.

1,491,753. COMBINED HAND AND POWER BRAKE; W. H. Sauvage, Flushing, N. Y. App. filed Sept. 16, 1919. For railway cars, etc.

1,491,769. TELEPHONE SYSTEM; C. R. H. Arntzenius, The Hague, Netherlands. App. filed Aug. 14, 1919. For long-distance communication through an intermediate station.

1,491,772, 1,491,773. METHOD OF AND SYSTEM FOR SELECTIVE WAVE TRANSMISSION; J. H. Hammond, Jr., Gloucester, Mass. App. filed April 26, 1912. By means of electro-radiant waves.

1,491,774. MULTIPLEX RADIO TELEPHONY AND TELEGRAPHY; J. H. Hammond, Jr., Gloucester, Mass. App. filed May 13, 1912.

1,491,775. METHOD OF AND SYSTEM FOR TRANSMITTING AND RECEIVING ELECTRO-RADIANT ENERGY; J. H. Hammond, Jr., Gloucester, Mass. App. filed Sept. 28, 1916.

1,491,776. SELECTIVE WAVE-TRANSMISSION SYSTEM; J. H. Hammond, Jr., Gloucester, Mass. App. filed May 9, 1912.

1,491,777. METER; A. D. Maury, Illion, N. Y. App. filed March 20, 1918. For registering the quantity of gasoline used in running an automobile.

(Issued April 29, 1924)

1,491,789. ELECTRICAL CONNECTION; C. W. Cowles, New Britain, Conn. App. filed Aug. 16, 1922. For grounding devices.

1,491,838. TERMINAL CONNECTOR FOR ELECTRICAL CONDUCTORS; O. Zimmermann, New York, N. Y. App. filed Dec. 1, 1919.

1,491,848. ARTIFICIAL LINE; G. Crisson, Hoboken, N. J. App. filed Oct. 15, 1919. For simulating a telephone or telegraph transmission line.

1,491,867. ELECTRICAL SWITCHING DEVICE; G. W. Kuhn, New York, N. Y. App. filed July 24, 1920. For telephone circuit, to effect successively a plurality of different electrical connections without rendering discontinuous the connection between the tip and ring sides of the circuit.

1,491,873. ADAPTER FOR CONNECTING DEVICES; A. McMurtrie, New York, N. Y. App. filed Nov. 10, 1920.

1,491,885. SHIELD FOR WIRING AND SWITCHES OF SWITCH-CONTROL FRONTS FOR ELECTRIC RANGES; S. D. Robinson, Hamilton, Ontario, Canada. App. filed Jan. 5, 1923.

1,491,900. PROCESS OF AND DEVICE FOR LOCATING ORE; D. G. Chilson, Jerome, Ariz. App. filed March 25, 1922.

1,491,903. TYPESETTING MACHINE MOTOR; A. L. Cushman and V. I. Caton, Concord, N. H. App. filed Feb. 11, 1922. Means for mounting motor upon the machine.

1,491,904. ANNUNCIATOR; V. Durbin, Brookline, Mass. App. filed June 30, 1919. Primarily for use on ships; signal locked in both positions.

1,491,944. PROCESS OF PRODUCING CHROMIC-ACID SOLUTIONS; A. W. Burwell, Poughkeepsie, N. Y. App. filed Jan. 23, 1922.

1,491,950. MEANS FOR VAPORIZING FUEL FOR INTERNAL-COMBUSTION ENGINES; W. M. Harrison, Chestnut, England. App. filed Jan. 5, 1923.

1,491,957. SLIP RINGS ON INDUCTION MOTORS; R. Kimura, Tobacho Shimagun Mieken, Japan. App. filed May 8, 1920.

1,491,960. APPARATUS AND PROCESS FOR REDUCING AND REFINING ORES; E. Mill, Los Angeles, Cal. App. filed Sept. 28, 1920.

1,491,987. ENGINE; J. A. Harlan, Dayton, Ohio. App. filed March 2, 1923. Internal combustion with means for varying the quality of the mixture during starting and running.

1,492,000. THERMIONIC DEVICE FOR WIRELESS TELEGRAPHY AND TELEPHONY; H. J. Round, London, England. App. filed Aug. 26, 1920. Low-resistance valve.

1,492,014. FIXTURE CHAIN; R. B. Benjamin, Chicago, Ill. App. filed June 7, 1919.

1,492,022. PROTECTIVE SYSTEM FOR ELECTRICAL MACHINERY; C. C. Eddy, Los Angeles, Cal. App. filed June 9, 1919. For disconnecting source of supply in case rotor rubs on stator.

1,492,038. FURNACE ELECTRODE; J. E. Leonarz, Tacubaya, Mexico. App. filed Sept. 22, 1921. Internal cooling.

1,492,079. MOTOR CONTROLLER; A. J. Liebenberg, Cincinnati, Ohio. App. filed Jan. 25, 1922. For electric elevators, for the prevention of high-speed motor operation under a load and rate greater than the high-speed normal capacity.

1,492,080. TUNING COIL; C. L. Marti, East Orange, N. J. App. filed Dec. 1, 1922. Support of adjustable length upon which the means employed for contact with the tuning coil operate.

1,492,086-1,492,087. ELECTRICAL SMELTING FURNACE; J. F. Shawhan, Dayton, Ohio. App. filed April 15, 1920. For smelting pyritic ores.

1,492,089. DIRECTION SIGNAL FOR AUTOMOBILES; W. E. Squier, Burkburnett, Tex. App. filed March 6, 1922.

1,492,092. TELEPHONE SYSTEM; R. S. Wilbur, Lyndhurst, N. J. App. filed Sept. 16, 1920. Employing long transmission trunk lines over which both telephonic and signaling currents may be transmitted.

1,492,096. DESK STAND; E. A. Bohlman, Chicago, Ill. App. filed Sept. 2, 1920. For automatic telephones.

1,492,121-1,492,122. ELECTROLYTIC CELL; F. V. D. Cruser and C. C. Haferkamp, Oswego, N. Y. App. filed Dec. 30, 1921. Where a carbon anode and a base metal cathode are employed.

1,492,137. REGENERATIVE CONTROL; R. D. McManigal, Logan, Ohio. App. filed April 18, 1922. For governing the operation of a motor during regeneration so that the braking torque of the motor will be substantially constant, regardless of relatively great changes in the speed of the motor.

1,492,138. ELECTRICAL BRAKING; H. R. Meyer, Wilkinsburg, Pa. App. filed July 22, 1921. Of a plurality of motors utilized for driving a railway vehicle.

1,492,146. ELECTRICALLY HEATED CREAM-DIPPING KETTLE; F. Thornton, Jr., Wilkinsburg, Pa. App. filed July 5, 1922.

1,492,151. TROLLEY-FROG-APPROACH STRUCTURE; C. Aalborg, Pittsburgh, Pa. App. filed Sept. 12, 1921.

1,492,157. CUT-OUT-SWITCH APPARATUS; A. H. Candee, Pittsburgh, Pa. App. filed Oct. 6, 1919. For cutting out either motor of a two-motor railway equipment.

1,492,160. PERCOLATOR; O. A. Colby, Irwin, Pa. App. filed June 10, 1922.

1,492,166-1,492,167. ELECTRODE AND ELECTRODE HOLDER FOR ELECTRIC ARC WELDING; J. E. Granger, Alhambra, Cal. App. filed Oct. 10, 1922. May be used with automatic and semi-automatic operating apparatus.

1,492,173. APPARATUS FOR BUTT-WELDING TUBING; A. Z. Johnson and N. A. Johnson, Jamestown, N. Y. App. filed April 6, 1922.

1,492,181. TRAIN-LINE RECEPTACLES; L. G. Riley and H. R. Meyer, Wilkinsburg, Pa. App. filed Oct. 6, 1919. For multiple-unit control circuits on electric railway cars.

1,492,195. ELECTRIC SWITCH; R. B. Benjamin, Chicago, Ill. App. filed Sept. 25, 1919. Of the pull-chain type.

1,492,197-1,492,198. ANTI-HUNTING REGULATOR SYSTEM; C. A. Boddie, Pittsburgh, Pa. App. filed Aug. 26, 1919. For governing the excitation of supply-circuit generators to maintain substantially constant voltage on supply circuits.

1,492,213. TELEPHONE SYSTEM; L. A. Mortimer, New York, N. Y. App. filed Dec. 29, 1919. Means for signaling over transmission lines.